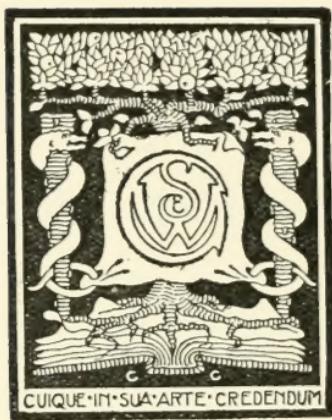# GYNECOLOGICAL TREATMENT
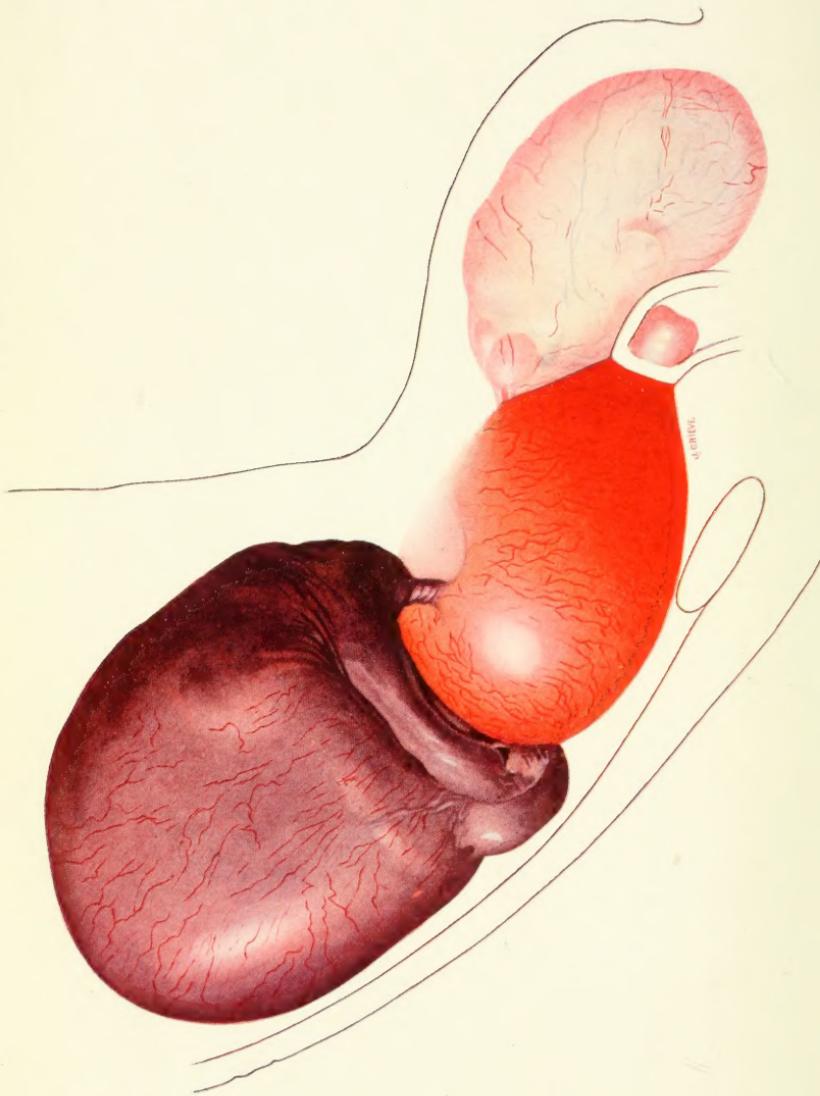
CUIQUE·IN·SUA·ARTE·CREDENDUM

PLATE I.

Case of three months pregnancy, complicated by a double ovarian tumour, one of which has a twisted pedicle (*see* p. 72)
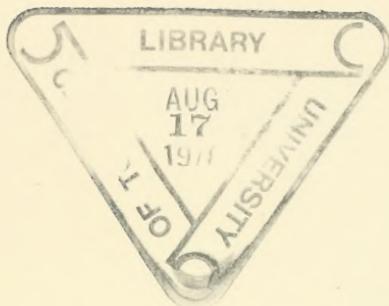
GYNECOLOGICAL TREATMENT

BY

A. H. F. BARBOUR, M.D., LL.D., F.R.C.P.

FORMERLY LECTURER ON GYNECOLOGY IN THE UNIVERSITY OF EDINBURGH
AND GYNECOLOGIST TO THE EDINBURGH ROYAL INFIRMARY

TO

MY FORMER STUDENTS

PREFACE

The following pages have been written at the request of my students that "Gynecological Diagnosis and Pathology" be supplemented by "Treatment".

To Dr. Douglas Miller I am much indebted for his aid in the preparation of this book; and to Dr. Robert K. S. Lim and Mr. John Grieve for many of the illustrations.

<div align="right">A. H. F. B.</div>

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

COLOURED PLATES

FIGURES IN TEXT

GYNECOLOGICAL TREATMENT

GYNECOLOGICAL treatment is preventive and curative.

If in nearly 50 per cent. of gynecological ailments the complaint is referred directly or indirectly to abortion or childbirth,[1] the student naturally asks to what extent this might be prevented. The pathological conditions directly due to these include a large proportion of the cases which the practitioner is called on to treat, *e.g.* cervical catarrh, chronic metritis, inflammation of the uterine appendages, the peritoneum and cellular tissue. By thorough asepsis in obstetrical work, intelligent management of the third stage of labour and the puerperium and careful handling of cases of abortion, the practitioner will materially reduce the frequency of these conditions.

Hence we see the advantage of the association of Gynecology with Midwifery, for it gives the practitioner the opportunity of following the subsequent gynecological history of his obstetrical cases. It also places the treatment of gynecological ailments in the same hands as those that supervise the confinement. The 'family physician' of a former generation, who followed his patient literally from the cradle to the grave, may have passed away, but his work is done, if his place is not taken, by the general practitioner who has under his care his gynecological patients and, when he finds himself unable to deal with them, passes them on to the specialist. Gynecology is often described as a specialty, but, from this point of view, there is no more reason to speak of Gynecology as a specialty than Midwifery, which is admitted to be part of the work of the general practitioner. A moment's consideration will show that the great majority of gynecological cases must be at first in the hands of the general practitioner. A married woman expects to be treated in the first instance by the physician who attended her at her confinement, and it is for him to say when she should pass beyond his care. The examination of her case is at first in his hands, the diagnosis of her condition rests with him, and the routine treatment of chronic cases, of what we might describe as Minor Gynecology, belongs to him.

The rapid development of Gynecological Surgery which began some

[1] See p. 4 of 'Gynecological Diagnosis and Pathology', to which this book is a Supplement.

I

fifty years ago, some of the greatest triumphs in abdominal surgery, notably ovariotomy and hysterectomy for fibroids and cancer coming from the operating gynecologist, threatened to carry Gynecology into the province of Surgery.

It is worthy of note, however, that Howard Kelly of Baltimore, one of the leading operating gynecologists in the United States, followed his classical treatise on 'Operative Gynecology' by an equally important work on 'Medical Gynecology'. In the Preface he says : 'To my mind the evolution of scientific medicine must ever run this course : The general practitioner yields up to a little group of investigators that portion of his territory which is most obscure and difficult, in which he has made the least progress ; the field is diligently cultivated and a specialty is formed. Then in time the specialist so simplifies the etiology, the diagnosis and the treatment, that he is able to hand back a part at least to the general practitioner . . . that portion of it which he ought to recover by right of his prior lien'.

And more recently in this country, Berkeley and Bonney followed their 'Text-book of Gynecological Surgery', the most concise and lucid exposition of operative technique we know, by a large volume entitled 'A Guide to Gynecology in General Practice'.

Gynecology has thus come to occupy a position between Medicine and Surgery ; and to belong equally to the brilliant operator and the sagacious practitioner. When honours go round, will the greater fall to the operator in his theatre furnished with every appliance and waiting for his patient to be wheeled in, or to the practitioner in his gig or motor car starting on a long drive across the moor ?

Another aspect of preventive treatment in Gynecology has of recent years attracted special attention. That which deals with the management of the girl during the period when she is passing into the woman— the proper regulation of her life at school and in the shop or factory, and of her entrance into married life and the necessity of her being prepared for all that this involves. It implies further the study of the stress and strain of modern life in so far as this is accountable for the neurasthenia and other complications met with in gynecological cases and to which the mother of a large family is liable.

Passing from prevention to **curative** treatment, this calls first for a study of the patient's temperament and environment, and of the pathological conditions of the reproductive system in relation to disturbances of the other systems—especially the digestive and nervous. Further, the pathological conditions described in Part II. of 'Gynecological Diagnosis and Pathology' should be studied not only in themselves, but as a link in a chain of cause and effect. For example, an intelligent study of inflamed appendages takes into account not only its relation

to a previous history of septic inflammation at childbirth or of gonorrhœal infection, but also its relation to the sterility following on the condition of the appendages, and the bearing of this on the birth-rate.

The *effect on the mind* of treatment directed to the pelvic organs must also be kept in mind. In an unmarried woman, examination followed by a course of local treatment may, by fixing her attention on the pelvic organs, do more harm than good. This is also true of married women who have come to think too much of a local condition. In the case of trivial lesions, to tell the patient that there is nothing the matter may be the best treatment.

We have seen [1] that the most frequent symptoms are *pain* and *hæmorrhage*. Further, that pain and hæmorrhage are often periodic,[2] related to the function of menstruation, and known as dysmenorrhœa and menorrhagia. Now, while scientific treatment is not symptomatic, that is, it is not directed merely to the relief of symptoms, but aims at the cure of disease, no treatment being satisfactory until a diagnosis is made, it is convenient, before taking up the treatment of the various pathological conditions, to look at treatment more generally.

The symptoms of pain and hæmorrhage are common to many conditions, and it will save repetition if we look first at treatment as directed to the *relief of pain* and the *control of hæmorrhage*, which will include the treatment of dysmenorrhœa and menorrhagia. With these disturbances of menstruation, it is convenient to consider amenorrhœa, which covers cases in which menstruation is scanty as well as those in which it is absent. Under methods of treatment common to many conditions, reference will be made to the vaginal and intra-uterine douche, vaginal tampons, the catheter and pessaries.

Relief of Pain.—Here the first thing is to ascertain the cause. Where it is due to a definite lesion, the treatment of that lesion will remove the pain ; *e.g.*, in cases of inflammation of the uterine appendages, relief is often only produced by surgical means. But there are many cases in which the connection between pain and a lesion is not direct. And there are others in which the state of the patient's nervous system or her nutrition is the more important factor, and attention to these will bring relief. There are yet other cases where pain apparently due to a pelvic cause has come to be independent of it, as in many cases of backache ; others in which the cause lies outside the pelvis in the abdomen, especially in the condition of the intestines ; and yet others where no lesion at all can be found.

Pain in the back has often been mentioned in connection with pathological conditions in the pelvis, but it is noteworthy that this may be well marked with no pelvic lesion and also that it is not present in many cases of pelvic inflammation. For these reasons backache in the

[1] 'Gynecological Diagnosis and Pathology', p. 4.   [2] *Ibid.* p. 8.

female, instead of being taken to imply a pelvic lesion, should be investigated as carefully and systematically as in the male—to exclude affections of the bones and joints, especially the sacro-iliac joint, and then of the muscles and nerves. Often backache is felt only when the patient feels tired : tiredness shows itself first in the back. The cause cannot in these cases be in the pelvic organs, and treatment should be directed to muscular weakness in the back. Great benefit is derived from a hot and cold douche down the spine at the morning bath—by pouring a can of hot water as hot as can be borne, followed by cold (cold is easily borne when preceded by heat), and rubbing the back with a hard towel. This followed by Swedish exercises directed especially to the muscles of the back, which the patient should do for herself as part of the daily routine after her bath. Massage is also useful but requires an expert masseuse.

As regards drugs—aspirin, tincture of nux vomica, or a course of anti-rheumatic treatment may also be beneficial.

Acute abdominal pain coming on suddenly in a patient who has been in good health suggests irritation of the peritoneum and is characteristic of ruptured extra-uterine gestation (where it is associated with fainting), or of escape of pus from a pus tube. It may also be due to appendicitis, to perforation of a duodenal ulcer, or torsion of the pedicle of a tumour.

Chronic pain in the lower part of the *abdomen* when due to pelvic adhesions is aggravated by whatever increases intra-abdominal pressure, is increased on exertion and relieved by lying down. Where the patient has to work for her living, the nature of her occupation has to be studied. Pain in the lower abdomen may be also due to intestinal causes : *chronic appendicitis*, ileo-stasis, irregularities of diet or constipation, towards which treatment must be directed. A *floating kidney* is a frequent cause, and careful palpation of the lumbar region will often reveal the cause of pain at first thought to be pelvic in origin.

In some cases *no lesion* is found. Not infrequently there is left-sided pain and yet no lesion found on careful bimanual examination. This has been attributed to ovarian neuralgia, to traction on the ovario-pelvic ligament or pelvic varicocele, but is often due to some condition of the colon.

In the treatment of chronic pain, where no pelvic lesion can be found, the first place must be given to the removal of *constipation*. The bowels may move every day and yet the colon never be properly emptied. Under the regular use of an aperient, the pain due to an over-loaded colon disappears. A tonic aperient of sulphate of magnesia, sulphuric acid and quinine is useful, or cascara in tabloids, and where there is digestive disturbance, rhubarb and soda. Aperient mineral waters and liquid paraffin are also of service. And massage is of value where there is weakness of the abdominal muscles and ileo-stasis.

Pain in uterine displacements is due to the stretching of the uterine supports, and is relieved by a properly fitting pessary; or where the appendages are inflamed, to the stretching of adhesions, in which case a pessary does more harm than good.

Arrest or Control of Uterine Hæmorrhage.—This is effected by the hot douche, packing the vagina and by drugs. The hot douche must be of a temperature 115° to 120°, as hot as the patient can bear. Care must be taken to protect the more sensitive vulva by smearing with lanolin and surrounding it with cloths wrung out of cold water. In packing the vagina the packing must be in one continuous piece for removal. This may be done by tying pledgets of sterile cotton wool on string, but it is better to use a continuous strip of gauze about 2 inches broad. If called to a bleeding abortion and sterilised gauze is not at hand, tear strips off a sheet or thin towel, tie them together, and boil in a kettle to sterilise them. For packing, a speculum is desirable, but where the speculum is not at hand, separate the labia by the fingers of the left hand, push in a small quantity of the packing between the separated fingers and then press it home. This prevents the vulvar hair being caught, when the packing is introduced, which causes the patient pain.

These methods are called for in cases of sudden and profuse hæmorrhage, such as threatened abortion or in cancer of the uterus. In the latter case, where the packing may have to be left in more than twenty-four hours, iodoform gauze is required or the packing may be wrung out of an antiseptic. The common form of hæmorrhage is increased flow at the period, menorrhagia, under which heading the use of drugs will be considered.

DISTURBANCES OF MENSTRUATION.

We pass now to disturbances of the menstrual function—Amenorrhœa, Menorrhagia, and Dysmenorrhœa.

Recent research as to the function of the endocrine glands has given a new standpoint for the study of Menstruation, which will affect the treatment of its disorders. Formerly it was thought that the ovary in the pelvis dominated the female economy (*Propter ovarium est mulier*) and controlled it through its nerve-connections. The fact that these could be severed and the ovary transplanted (stitched in the abdominal wall) and menstruation go on, showed that this earlier view was inadequate and that the 'ovarian influence' must also be exerted through the circulation. That is to say, the ovary is a laboratory in which biochemical substances are elaborated which are poured into the circulation as an 'internal secretion'. These biochemical substances are derived from the ovarian tissue generally, and from the lutein cells

of the corpus luteum when these develop in connection with the ripening and rupture of a follicle.

Further, it has been shown that the ovary is only one of several 'ductless glands', namely, the pituitary (its anterior lobe), the thyroid and supra-renal, each of which makes its contribution. What the exact function of each is we do not yet know; the pituitary apparently functions first, presiding over the development of the ovary and uterus and the secondary sex characteristics.

Whatever the function of each is, they are correlated as parts of a chain and work together—when one is inadequate, the others compensate. To borrow an illustration from the decorative part of the female economy—the ovary is not a diamond brooch fixed by and functioning through the pin, but a pendant from a chain into which are introduced the pituitary, thyroid and supra-renals.

This is the new conception of the ovary, the new standpoint for looking at menstruation and its disorders. Its significance for treatment is obvious. Glandular therapy is coming to have its place not only in the treatment of amenorrhœa and menorrhagia, especially functional menorrhagia at puberty and the menopause, but of dysmenorrhœa due to defective development—the spasmodic form often associated with anteflexion. Extracts have been prepared from the whole ovary, from the corpus luteum and from ovarian residue. Extract from the whole ovary is useful to counteract the unpleasant symptoms of the menopause, whether natural or induced by operation; while corpus-luteum extract, on the theory that the formation of lutein determines menstruation, should be tried in the irregular or scanty menstruation of youth.

Thyroid extract may be given in small doses, 1 grain at bedtime and continued for a lengthy period as recommended by Dr. F. J. M'Cann in his suggestive book on the 'Treatment of Common Female Ailments'. Of glandular therapy he says that its rôle in the treatment of menstrual disorders is 'not to replace the old remedies, but rather to assist in obtaining better and quicker results'.

Pituitary extract is useful in menorrhagia, and if the pituitary body presides over development, is worthy of trial in the dysmenorrhœa and scanty menstruation of defective development.

Combinations of these are made up as polyglandular extracts.

AMENORRHŒA.

This includes cases where menstruation is diminished or the intervals prolonged, as well as where it is absent—which the word means. The latter is *physiological during pregnancy and lactation and after the menopause.*

Physiological Amenorrhœa is the proper term to use in discussing

the possibility of pregnancy in the presence of unmarried patients. Care is required in investigating such a case to prevent the patient or her friends from seeing that pregnancy is present to the mind as a possible explanation for the patient's symptoms, until we are absolutely sure that this is the case. A girl in service or working in a shop or factory who is suffering from anæmia comes to seek advice because menstruation has been absent. As these cases take on fat, which causes mammary enlargement, the suspicion of pregnancy arises. On examining the heart we can observe the condition of the mamma without the patient noticing it, and determine that the mammary enlargement is due to adipose tissue and not to increased glandular development. On lifting the mamma for auscultation of the heart, we recognise the indefinite fulness of fat instead of the firm lobular enlargement of glandular tissue, and can compress it to see whether there is colostrum. Further, should gastric symptoms be complained of, this is a reason for palpating the abdomen. If the amenorrhœa be physiological and of four months' duration, the uterus will have risen above the brim ; and the presence of abdominal enlargement justifies vaginal examination. During the first two or three months this is not necessary, as the enlargement of the uterus on bimanual examination is not sufficient to make one absolutely sure of pregnancy, and the case may be treated as one of anæmia for a few weeks. The reason for such care in investigating a case is that harm is done to a sensitive patient by showing that one is thinking of pregnancy in circumstances where it could not possibly have occurred.

Should, however, a patient seek advice who admits the possibility of pregnancy, a more thorough examination should at once be made. While pregnancy may be recognised as early as eight weeks, certainty cannot be attained till the third month. But as it is the *progressive enlargement* of the uterus that counts in the diagnosis of early pregnancy, it is important to estimate the size of the uterus at an early date and make a careful note of it for comparison with the condition found a few weeks later.

Amenorrhœa is also physiological *after the menopause,* which occurs usually in the late forties, but may be antedated, some patients ceasing to menstruate as early as thirty-six. This condition, described as a premature menopause, should always be carefully inquired into, to eliminate any other explanation.

Pathological Amenorrhœa. —When not due to physiological causes, amenorrhœa is only rarely a manifestation of local disease of the female generative organs. In the majority of cases the cause will be found in some constitutional condition, anæmia, phthisis and all debilitating diseases or lowered conditions of health. In this respect it is markedly different from menorrhagia, where the cause is usually local and but rarely due to constitutional disease. Of **constitutional causes,** the most

frequent is chlorosis or anæmia. A less frequent cause is some **tuber-culous** condition, *e.g.* phthisis, or tuberculous tubes. Another group of general causes is best described under the term of delayed puberty. The general and sexual development is complete and yet the girl fails to menstruate. This may be the result of physical strain. Among the poor who do a great deal of outdoor manual labour at an early age, menstrua-tion is often delayed. Conversely, brain-workers may suffer from the same symptom. Overwork seems to throw out of balance the nutritive and reproductive systems. The influence of the nervous system is also a remarkable factor, as is seen in the cases of *pseudo-cyesis*, where the desire to become pregnant or the supposition that she is pregnant causes suppression of the flow. This also occurs in melancholia and other forms of *insanity*, of which, however, the explanation may lie in the changes produced in general nutrition rather than a direct influence of the generative organs. In this category also may be placed influence of the general environment, as is seen when a servant goes first from the country to the town, or a girl goes abroad to school.

Attention has recently been directed to the influence of the ductless glands, especially the thyroid and pituitary, on the onset of menstruation. Enlargement of the thyroid is sometimes noted in girls at this time. And the amenorrhœa of puberty responds to the administration of thyroid extract. Later in life, amenorrhœa, with the taking on of fat, has been ascribed to disease of the anterior lobe of the pituitary.

Of **local causes**, those which operate at the commencement of the period of sexual vigour are the various *Malformations*. The uterus or ovaries may be poorly developed, so that the patient does not menstruate at all, or there may be atresia with accumulation of the menstrual flow. At a later period menstruation may be suppressed in a child-bearing woman as the result of super-involution. Another local cause of diminished menstruation is inflammation beside the uterus and especially in the cellular tissue—utero-sacral cellulitis.

From the foregoing it will be evident that there is no treatment for amenorrhœa due to local causes, except in the rare cases of atresia due to imperforate hymen or atresia of the vagina, under which head it will be considered (p. 79). Strictly, these are not cases of amenorrhœa, for the patient is menstruating though the blood does not appear.

In the development of the generative organs and in the maintenance of their activity, the internal secretion of the ovary plays a predominant part, but in addition to it we have seen that other ductless glands, especially the pituitary and the thyroid, have an important rôle. In certain cases of under-development and of impaired function resulting in amenorrhœa, great improvement can often be obtained by the administration of the various gland substances. The combinations which give the best results are ovarian or lutein substance, along with either the substance of the

pituitary gland or thyroid. In making a choice between the two last the general aspect and history of the patient is the guide. The usual dosage is 5 grains of the ovarian, and 1 to 2 grains of thyroid once a day to begin with.

Where the uterus is poorly developed or is atrophied, there is no treatment to stimulate its growth. But a great deal may be done to relieve the patient's mind by explaining to her that the non-appearance of the flow is normal in her case. If the cause be anæmia or tuberculosis, the treatment is directed to these conditions, and here also it is well to explain to the patient that her amenorrhœa is conservative and to her advantage. In the case of delayed menstruation at puberty, drugs such as permanganate of potash or apiol may be given. In chlorosis an aperient should be combined with the iron given in Blaud's pills or capsules; or as 'reduced iron' in doses of 3 to 5 grains, thrice daily. Iron and arsenic is a useful combination.

MENORRHAGIA.

This is a more serious disturbance than amenorrhœa, as loss of blood impairs health and may endanger life. In determining the cause, the necessity of pelvic examination, which in amenorrhœa is only pressing in the case of the exclusion of pregnancy and the extremely rare condition of atresia, becomes prominent. Though in young girls, from the undesirability of vaginal examination unless it is absolutely necessary, the case may have to be treated on symptomatic lines in the first instance.

Menorrhagia is liable to occur in growing girls when the menstrual function is being established and especially where the environment is prejudicial to health. Girls who are brought up in luxury or over-taxed at school often show disturbance of the menstrual function, sometimes as amenorrhœa due to anæmia, and sometimes menorrhagia. On inquiring into the school régime, we may find that the period of work may not be excessive for a healthy girl but that the hours of leisure are not arranged for. Fortunately, more attention is now being paid to physical culture than formerly, and more thought is being given to the girl at a period of life when she is passing into the woman.

The *general causes* of menorrhagia are the acute infectious diseases, influenza epidemics; also conditions of the blood such as hæmophilia; alcoholic excess, in which case it is probably due to the liver congestion, which may give a hint as to the habits of the patient who always conceals this failing; excessive exertion and fatigue at the monthly period, or change of environment such as going to a hot climate. It is liable to occur at the commencement of menstruation—the menarché, and at its cessation—the menopause. In the latter case the possibility of cancer

must always be kept in view and a careful examination made, including diagnostic curettage.

The *local causes* may be associated with the uterus or its appendages. In a child-bearing woman the most frequent are conditions of the mucosa following childbirth or a recent abortion ; or of the muscular wall— chronic metritis, and interstitial and submucous fibroids. In malignant tumours and polypi the bleeding is independent of the period. This has been described as metrorrhagia to distinguish it from menorrhagia.

The **treatment** of menorrhagia is the treatment of the condition producing it. Where a definite removable cause is found and can be removed by surgical means, *e.g.* curetting the uterus after abortion or the removal of a polypus, or hysterectomy in cases of fibroid tumour, malignant disease or fibrosis uteri, the cure is immediate.

Usually we have to proceed more gradually by drugs which control the hæmorrhage through acting on the muscular fibre of the uterine wall or its blood-vessels, *e.g.* ergot, or favouring the coagulation of the blood, such as calcium chloride or lactate. Ergot is given as the liquid extract alone or combined with strychnine ; the most active preparation is ergotin in pill or tabloid, of which the dose is 4 grains. Hydrastis canadensis and hamamelis, which do not cause uterine contractions, may be tried where ergot cannot be borne or has failed.

Ergot is most useful when the musculature of the uterus is well developed as in child-bearing women ; it is not of so much value for the menorrhagia of young girls. In them viburnum prunifolium is better. Adrenalin (15 drops of a 1–1000 solution) is also useful.

In radium and X-rays we have now two powerful agents for the checking of excessive menstruation and uterine hæmorrhage. Both act directly on the uterus and on the ovaries. The treatment must be carried out by an expert, and the technical details cannot be entered into here. According to the strength, the length and the number of exposures, complete amenorrhœa or only a diminution in the flow may be produced. The type of cases suitable are hæmorrhage at the meno-pause—fibrosis, and hæmorrhage from fibroid tumours except the sub-mucous variety. In all cases malignancy must be excluded, and in most a diagnostic curettage is therefore necessary. As a rule this treatment should not be employed in young women as an artificial menopause and consequent sterility result.

DYSMENORRHŒA.

To treat dysmenorrhœa intelligently we must endeavour to find out its cause and try to make out how the pain is produced. Two pre-liminary considerations must be borne in mind :

1. *In pain there are two factors*, a peripheral stimulus A, and a central nerve-cell B (fig. 1)—that is to say, the cause may lie in the

pelvis or in the central nervous system. Where menstruation has always been painful, the chief factor is frequently in B. In patients of a naturally sensitive or highly strung nervous organisation—the artistic temperament, or whose education has made it so—overstrain at school, or in whom self-control has not been developed—neurotic cases, there arises what we may describe as *inability to bear pain*. Here the line of treatment is educational; the patient must be taught to take herself in hand. In other cases there has been faulty environment, over-pressure at school with lack of the physical culture necessary to counteract this evil, a disregard of the proper handling of the girl at the time when she passes into the woman. Treatment here is directed to improve the environment.

Only occasionally is the cause in A a congenital condition of the uterus, *e.g.* anteflexion or faulty development of the uterus, which calls for direct local treatment.

2. *The menstrual period is part of the menstrual cycle.* Before the period there is congestion with hypertrophy of the mucosa, constituting
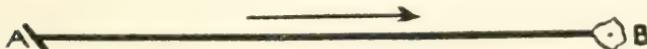
FIG. 1.—TWO FACTORS IN PAIN.
A peripheral stimulus A, and a central nerve-cell B.

a pre-menstrual phase. This is followed by blood extravasation into the mucosa, part of the blood finding its way to the surface and escaping as the menstrual flow. This blood does not coagulate as has been demonstrated by chemical examination of the blood from cases of hæmato-colpos, as the accumulation of blood in the vagina which occurs in cases of atresia is called. Blair Bell, who has investigated the blood in this condition, explains its non-coagulation by the absence of the fibrin ferment from menstrual blood—in its passage through the uterine mucosa during menstruation the blood *loses the fibrin ferment*. After the flow the mucosa undergoes involution and repair. If we represent the congestion with the hypertrophy of the mucosa by a rising curve, we may plot out the four weeks' menstrual cycle thus (see fig. 2).

Looking at dysmenorrhœa in its relation to this cycle, we find that when the pain is associated with the first week, the cause (if it is pelvic), is more likely to be uterine. Pain before the flow, sometimes relieved by it, is more common in inflammation of the appendages.

A very rare form is *intermenstrual*. In this case a patient complains of pain going on regularly for a few days between the periods. From its periodicity it has been ascribed to ovulation, of which there is no evidence. In some cases salpingitis has been found on abdominal section, and the

pain ascribed to accumulation of fluid distending the tube. The relief given by surgical treatment favours this view of its production.

How is the pain produced ?

Normally there is only a feeling of fulness and discomfort associated with these anatomical and physiological changes. When it passes into pain, there may be found a gross pathological lesion, *e.g.* endometrial changes, fibroid tumours, inflamed appendages. These pathological conditions do not necessarily have dysmenorrhœa associated with them ; but, when it is present, they are probably the cause of the pain.

More difficulty arises to explain the pain when no lesion is found. The increased flexion of a uterus found in anteflexion is not a *vera causa*, as that condition is often present without any pain at the period. For want of a better explanation we must fall back on pain as due to tension, the swelling of the mucosa at the period and the extravasation of blood into it, or excess of fibrous tissue in the wall interfering with the
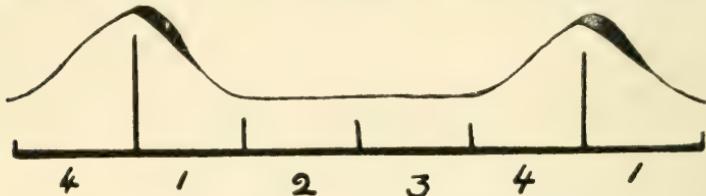
FIG. 2.—MENSTRUAL CYCLE OF FOUR WEEKS.

4. Week of pre-menstrual phase ; 1. Week of period of bleeding which lasts three or four days, indicated by darker line, followed by involution and repair of mucosa ; 2, 3. Resting stage.

expansion or erection of the uterus. Clinical proof of this as a cause is found in the relief afforded by forcible dilatation and curetting.

There is no evidence that the pain in anteflexion is due to the angle of flexion interfering with the escape of blood. The blood comes *guttatim* and does not clot in the uterus under normal conditions.

Two varieties of dysmenorrhœa may therefore be described :

(1) That in which pain has always been associated with the function, not always going back to puberty but coming on two or three years later. No definite lesion is found, or, when found, it is associated with the uterus, not the appendages. It is present in the virgin before marriage and relieved by childbirth. To this variety various names have been given : *primary*, the pain being a primary phenomenon rather than the symptom of a definite pathological condition ; *virginal*, because it is present in the early years and before marriage and is relieved by childbirth ; *spasmodic*, the pain being suggestive of muscular spasm, which gave rise to the old view of its being due to uterine contractions to expel menstrual blood or fragments of mucosa.

(2) In the second variety, the pain is due to congestion of diseased structures, hence it has been called *congestive* ; also *secondary*, as it is consequent on one of the many pathological conditions already described, *e.g.* chronic metritis, fibroids, inflammation of the appendages or cellulitis.

Besides these two varieties in which the dysmenorrhœa goes back to puberty, or comes on later in association with the development of a pathological condition, there is a rare form in which the mucous membrane is cast off as a triangular sac, or in shreds of more or less firm consistence. It is of the greatest importance to remember that this is not a product of conception and should not be mistaken for an early abortion. To the expulsion of such a membrane associated with pain, the term *membranous dysmenorrhœa* has been applied.

The term *obstructive dysmenorrhœa* used to be applied to cases in which it was supposed that the pain was due to uterine contractions induced to expel blood-clot at the period.

The influence of the monthly period upon the whole system is brought out by the fact that pain in areas beyond the pelvis is aggravated at that time. Pain in the back is often not directly dependent upon any pelvic disease, and may be due to neurasthenia or other run-down condition of the patient, and backache may be more pronounced then. Headache of a nervous nature which may be accompanied by vomiting is marked at these times also. Affections of the nervous system are also aggravated, as is seen in the association of epilepsy with the period and increased disturbance in mental cases.

So much for the cause and nature of the pain in dysmenorrhœa. We pass now to its **Treatment.**

In many of the 'primary' cases there is undoubtedly an under-development of the uterus and other generative organs resulting in a more fibrous and sclerotic condition than normal. In such, benefit may be derived from the administration of corpus luteum extract in 5-grain doses or a combination of that with pituitary or thyroid gland substance.

If such a condition can be excluded, or even if present, further treatment should begin by giving an aperient for a week before the period so as to ensure regular loose action of the bowels—either cascara or salts. When the period is coming on, a hot hip bath or placing the feet in mustard and hot water lessens the pain by drawing the blood from the pelvis. Hot drinks have the same effect, but these should never contain alcohol. Many of the cases of alcoholism in women can be traced to its being taken first in connection with the monthly period. And for the same reason morphia should never be given, or, if given, the patient should not have control of the prescription, as she begins to take it

regularly and beyond the period until the morphia habit is formed. The question of rest requires careful study, as some cases derive benefit from resting for a few hours or during the first day, while in others the patient should be encouraged to go about. The prevention of over-exertion in the case of young girls at school requires consideration, absence from school being indicated in severe cases and the healthy regulation of life out of school. To relieve the pain, various drugs may be given, such as antipyrin, phenacetin, phenalgin, ammonal or antikamnia. Of these the best is antipyrin in doses of 5 to 10 grains. To counteract its depressing action, spirit. ammon. aromat. may be combined with it. Viburnum prunifolium in capsules (min. 30) or liq. caulophylli et pulsatillæ co. (in drachm doses), or apiol (1 gr. in capsule) are also useful. In neurotic cases the bromides are useful, e.g. bromide of sodium in 10-grain doses. Between the periods the patient's nervous system should be built up by attention to diet, exercise and nerve tonics.

In the case of unmarried young women, if after a fair trial medicinal treatment gives no relief and the symptoms are urgent, then and not till then pelvic examination should be advised. This should be done under chloroform and arrangements made for dilatation of the cervix and curettage being carried out at the same time, should the operation be found to be indicated.

The *operative treatment* will be described under Gynecological Operations. Dilatation is carried out either by graduated dilators or an expanding instrument. The former is preferable, as it is less likely to tear the cervix. The most suitable cases are dysmenorrhœa of the spasmodic or virginal type associated with congenital anteflexion. Where the anteflexion is secondary to pelvic inflammation or where inflammation of the appendages is found on examination, dilatation is contra-indicated. In cases of congenital retroversion, it may be tried, but the result is not so satisfactory. If the uterus is found enlarged or there is menorrhagia as well as dysmenorrhœa, curettage may also be performed.

The foregoing refers to the treatment of dysmenorrhœa as a primary condition. Where it is secondary to a definite pathological condition the treatment is directed to dealing with that, though in these cases also dysmenorrhœa may be treated symptomatically.

So much for treatment as directed to pain and hæmorrhage, and the disturbances of menstruation. Before going on to treatment of the definite pathological conditions, something requires to be said of some methods of treatment peculiar to gynecology, namely, the vaginal and intra-uterine douche, vaginal tampons and pessaries. The use of the catheter also calls for special note.

Vaginal and Intra-uterine Douche.—The vaginal douche is used to cleanse the vagina, and to apply astringents and antiseptics; in the treatment of pelvic inflammation; and to arrest hæmorrhage. Also, as a preliminary to operations, to render the field aseptic.

A convenient form of this is shown in fig. 3. It is hung up after being filled, and a gentle flow thus obtained by gravitation. The overflow from the vagina is received into any suitable receptacle on which the patient lies.

Instead of the douche can, a tube working by syphon action may be employed (fig. 4). This consists of a 'sinker', a long piece of gutta-percha tubing with a bent piece of glass tubing inserted so as to render it rigid where it passes over the edge of the vessel containing
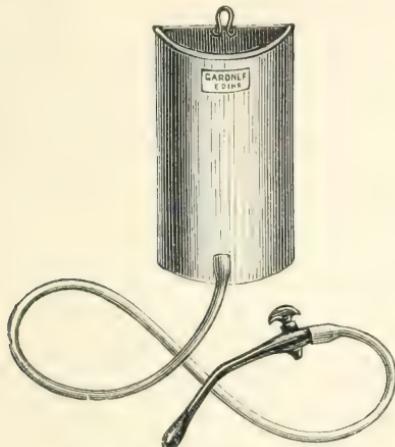
FIG. 3.—VAGINAL DOUCHE.   FIG. 4.—SYPHON DOUCHE.
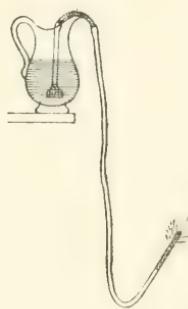
the fluid, and a terminal vaginal tube. The 'sinker' should be large and hollow, so that when inverted it may serve as a cup by which the tube is filled with water; once filled, the tube is temporarily compressed while the sinker is being dropped into the jug or pail full of water ready for use.

To understand vaginal douching, it should be noted that the vaginal walls are in contact and folded, producing the rugæ. If the patient douches herself in a sitting posture, the water runs in and out again without separating the walls or opening out the folds. *In the recumbent position* and *with the hips elevated*, the water balloons the vagina and opens out the folds. Hence the douche, to be effective, must be given in this position. And this requires a nurse. If the patient has to douche herself, she should lie down in a bath with the douche on a table or

hung on the wall within reach so that she can refill the can from time to time.

The temperature of the water is of importance. A *prolonged warm* douche is of use in causing the absorption of inflammatory deposits. Here the douche is given for ten to fifteen minutes once a day. The warm water dilates the blood-vessels, and the hyperæmia favours absorption. The *hot* douche, in the treatment of hæmorrhage, is from 110° to 120°. The vaginal mucosa can stand this temperature, but the sensitive skin must be protected by smearing the vulva and perineum with lanolin. It should be noted that unless the douche is as hot as the patient can bear, it increases hyperæmia and the tendency to hæmorrhage. The temperature of the douche should be tested by a thermometer; and if the water is mixed in the can, the cold should be put in first so that the tube may not be filled with very hot water.

For antiseptic purposes perchloride of mercury, 1 in 4000, is the most efficient. Boracic acid is an excellent mild antiseptic, in the proportion of ʒj to the pint. The crystals should be used, not the fine powder.
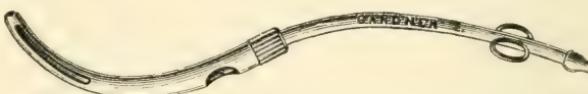
FIG. 5.—FRITSCH'S CATHETER FOR WASHING OUT THE INTERIOR OF THE UTERUS.

Alum, sulphate of copper, or sulphate of zinc (ʒss to Oij) may be substituted for boracic acid, if a local astringent action is thought necessary.

An antiseptic douche should only be prescribed when there is reason to believe that the vaginal secretion contains pathogenic organisms. The use of an antiseptic under other conditions destroys the vaginal bacillus—the natural protection against septic infection. Much harm is done by the indiscriminate use of antiseptic douches. The habit of douching acquired by patients may keep up leucorrhœal discharge, for which the treatment is to stop the douche.

Further particulars as to the use of antiseptics and astringents will be given under the treatment of vaginitis and of cervical catarrh. It should be noted that the action of these in a vaginal douche is limited to the vagina and the area of the cervical mucosa that may be exposed within it.

The *intra-uterine douche* is used to wash out the uterine cavity after the operation of curetting, also to check hæmorrhage and to control sepsis. When used to check hæmorrhage, the temperature is 120° Fahr., so as to cause contraction of the blood-vessels of the uterus. For

antiseptic purposes, the best lotion is corrosive sublimate—1 in 4000—and the corrosive douche should be followed by hot sterilised water if the uterine cavity is dilated, as in washing out the uterus after the removal of abortion. For washing out the uterus a double-channelled catheter is required to prevent the fluid being forced through a patent Fallopian tube into the peritoneal cavity. A convenient form is that of Fritsch (fig. 5). It consists of a metal tube with a double curve, over the uterine end of which a shorter perforated tube, to carry the lotion back from the uterus, is fixed by a screwed collar. Before inserting the catheter some of the lotion is allowed to flow through it so as to expel air. The douche can should not be held high, only at a sufficient level to allow the lotion to flow freely. Before giving a uterine douche, the external genitals should be cleansed and the vagina thoroughly douched.

The **vaginal tampon** is used in the treatment of pelvic inflammation. A piece of sterilised absorbent cotton wadding about 5 inches square is taken, to the corner of which string 6 or 8 inches long is tied. Half an ounce of glycerine is poured into the wool, the corners are gathered up and turned in so that the whole of the wool is saturated with it. The glycerine by its hygroscopic action withdraws the serum from the tissues and sets up a serous discharge. The patient should be told this, that she may wear a napkin. To the glycerine, ichthyol may be added (10 per cent.). The tampon is most easily introduced with the aid of the speculum, or the perineum may be hooked back by the index and middle fingers of the left hand, which are at the same time separated so as to produce a space through which the tampon may be introduced without the hair being dragged in. Reference will be made to this again in the treatment of inflammation of the appendages. The tampon when introduced at night after a vaginal douche is withdrawn before the douche on the following morning, or may be left for twenty-four hours if there is no morning douche.

Packing the vagina for hæmorrhage has already been referred to (p. 5).

Pessaries.—A vaginal pessary is a splint: used to keep in place a displaced uterus after it has been replaced. Unfortunately it does not always do this, hence the operative treatment of displacements is replacing the pessary. Pessaries, especially the rubber ring, also set up vaginal discharge and their use requires constant supervision, so that in the case of patients who have to work for their living, operation is always to be preferred.

Displacements are either backward or downward, and each has its appropriate pessary : for retroversion, the Hodge or, its modification, the Albert Smith; for prolapse, the ring. The Albert Smith is truly a splint, in form adapted to the anatomy of the vagina, and in action

2

doing the work of anatomical structures which have lost their tone. The ring does not adapt itself to the form of the vagina, but stretches it so as to make its calibre greater than the relaxed vaginal outlet. All prolapse pessaries are expanding pessaries.

Other pessaries, *e.g.* the 'cradle' for so-called anteversion, and intra-uterine stem for retroflexion, have been relegated to the museum; their interest is historical.

It is convenient to consider the Hodge and ring under the appropriate displacements.

The catheter is called for where a patient is unable to pass her water, or to obtain a specimen for examination.
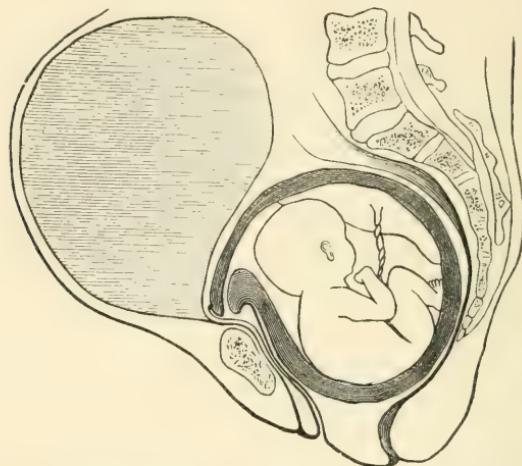
FIG. 6.—DISTENDED BLADDER DUE TO RETROVERSION
OF THE GRAVID UTERUS.

In passing the catheter the most scrupulous asepsis is required, and disastrous consequences may follow neglect of this principle. Either a glass or a soft rubber catheter may be employed; the instrument is sterilised by boiling for ten minutes and then placed in a basin of sterile water. The patient lies in the dorsal position with the knees drawn up and the genitals exposed. The hands being aseptic, the labia are thoroughly cleansed and then separated by the fingers of the left hand while the vestibule and vaginal orifice are carefully swabbed with an antiseptic solution such as corrosive sublimate (1–2000) or lysol (1–100). A swab soaked in the solution is then placed just within the vaginal canal. The catheter is taken in the right hand and, without touching the surrounding parts, is introduced into the meatus. Should the instrument not pass easily into the bladder, the index finger of the

left hand is placed in the vagina so as to guide it along the urethra. For laboratory examination the urine may be received directly into a sterilised bottle, which is at once closed with a sterile cork. On withdrawing the catheter, the thumb of the right hand is placed on the end of the instrument to prevent soiling by escape of the urine in the catheter or the suction of air into the bladder.

In the presence of a persistent discharge, gonorrhœal or septic, the passage of a catheter entails great risk and should only be had recourse to as a last resort. The antiseptic preparations must be made with special care, and before the introduction of the instrument the urethra should be thoroughly irrigated with a weak antiseptic solution, such as pot. permang. (1–5000). In cases where difficulty of micturition is due to the presence of a tumour on the urethra or neck of the bladder, it is better to use a gum elastic catheter.

In *gynecological diagnosis* a distended bladder is a frequent source of error. To begin with, the practitioner is thrown off his guard by the patient's statement that she has recently passed water, due to the dribbling from over-distension. Further, the bladder forms a cystic tumour reaching to the umbilicus or above it, closely resembling an ovarian tumour; though the distended bladder creeps up behind the abdominal wall in a way that cystic pelvic tumours do not. We have on more than one occasion removed an ovarian tumour sent into the ward, not with the knife but the catheter.

Again, in cases where retention is due to a tumour in the pouch of Douglas, as in retroversion of the gravid uterus, the cervix is tilted upwards carrying the bladder with it, so that the organ stands at a higher level, and a gum elastic catheter is required to reach it, just as when the bladder is displaced upwards in the second stage of labour (fig. 6).

Further, through the pressure of the tumour against the symphysis the bladder may be divided into two portions—abdominal and pelvic, and on passing the catheter only the latter part is emptied. We recall a case in which we passed the catheter, drew off 12 ounces of urine and thought there was still an abdominal tumour; the nurse passed the catheter later and drew off 100 ounces. The gum elastic catheter after emptying the pelvic portion had coiled up within it and not reached the abdominal. Since then we have in all doubtful cases of cystic tumour rising out of the pelvis used a male prostatic catheter, the point of which could be palpated above the brim of the pelvis, showing that the bladder had been completely emptied, and we advise the practitioner to do the same.

TREATMENT OF THE
VARIOUS PATHOLOGICAL CONDITIONS.

We consider the treatment of the various pathological conditions in the same order as in 'Gynecological Diagnosis and Pathology'.

Malformations of the Uterus lie beyond the range of treatment, except when they give rise to retention of menstrual blood or of the products of conception. Fig. 7 is an interesting specimen of a uterus removed by Dr. William Fordyce from a patient aged nineteen who had menstruated for two years with increasing pain, calling at last for hysterectomy.

Atrophy of the Uterus, whether present as a congenital condition
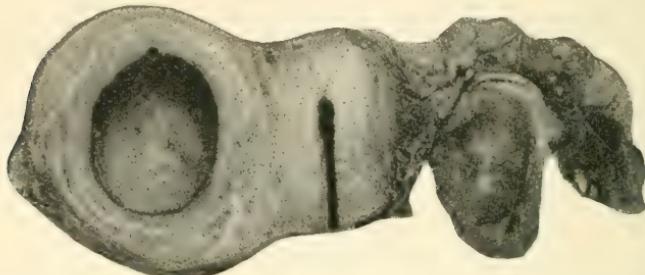
FIG. 7.—UTERUS REMOVED BY HYSTERECTOMY, SHOWING ACCUMULATION OF BLOOD IN THE NON-PERVIOUS HALF, WHICH DOES NOT COMMUNICATE WITH THE VAGINA.

or arising in later life as the result of super-involution, may be improved by the administration of ovarian, pituitary, and thyroid gland substances as before mentioned (p. 6). In both of these cases it is important to explain to the patient the cause of the absence of menstruation, so as to set her mind at rest as to its non-appearance. She should be told that amenorrhœa is the natural condition under the circumstances, is the normal thing for her, and is of no consequence. The general condition of the patient may be improved by iron and other constitutional treatment.

Displacements of the Uterus. — The introduction of the sound by J. Y. Simpson, by which the position of the uterus as well as its size was determined, fixed attention on, and gave undue prominence to, the position of the uterus as a factor in gynecological ailments. Round it grew up a system of thought which took on a quasi-scientific form, witness Graily Hewitt's ' Mechanical System of Uterine *Pathology*'—the italics are ours. It led to the era of the pessary : every form of artificial

support that the wit of man could devise was made. Even displacements were imagined to exist to give justification for the use of a certain pessary : for example, 'anteversion', to be treated by the 'cradle pessary'. The study of sectional anatomy, however, brought the gynecologist back to facts, and abdominal section gave an opportunity of looking into the pelvis and not only of seeing exactly what the condition of the pelvic organs was in relation to the clinical picture drawn from the history of the case, but of treating displacements by operative measures. What has been the result? Anteflexion is now regarded as part of a developmental anomaly in which the size and texture of the uterus is of more significance than its form. Retroversion in itself is only occasionally of importance in relation to symptoms. Perhaps its chief significance is in connection with the early stage of prolapse. It is noteworthy that the uterus in descent follows the axis of the pelvis. About the level of the brim or just below it, its normal position, it is anteverted ; in the cavity, when prolapse is commencing, it lies retroverted.

Retroversion and prolapse are characteristic of the multipara and have a common cause in the puerperal condition ; or rather in the non-return to normal, during the puerperium, of the supports of the uterus which have been injured in labour.

ANTEFLEXION.

In the treatment of this condition, we must distinguish between the cases in which it is congenital, being present from puberty, and acquired or arising later in life as the result of utero-sacral cellulitis. In the latter case it is simply an index of the cellulitis which is the lesion, and its treatment will be considered under that of pelvic cellulitis. Congenital anteflexion, in which there is exaggeration of the normal forward curvature and nothing more, is only of consequence when it has the symptoms of dysmenorrhœa and sterility associated with it ; and treatment is not directed to lessening the flexion if this were possible, or changing the lumen of the canal, but to relief of the symptoms. The dysmenorrhœa should first be treated along medical lines, and if these fail, by operation —dilatation or division of the cervix. For both conditions, in addition to dilatation, the cervix may be divided in the middle line posteriorly with advantage. For both these operations see 'Gynecological Operations'.

RETROVERSION.

Retroversion is easy to diagnose, but hard to treat. Its treatment calls for study of the cause that produces it and the conditions that accompany it. It may be congenital or the result of adhesions, or arise during the puerperium ; it may be simple or have inflammation associated with it, usually in the uterine appendages. The relative frequency of these conditions is shown in fig. 8.

Displacement suggests replacement, but a glance at the diagram will show that in only a limited number of cases is it a question of simple reposition of the uterus. Congenital cases should be left alone, as the uterus has grown in that position, which is the natural one for that patient. A uterus bound down by adhesions should be left alone unless we are prepared to open the abdomen, break down the adhesions and fix the uterus to the front. Where there is inflammation of the uterine appendages, it is that which calls for treatment, and if that requires abdominal section the uterus may at the same time be fixed to the front. Cases of uncomplicated retroversion fall into two classes—those which produce symptoms and those which do not. While the former certainly call for treatment there is room for difference of opinion with regard to the latter. The fact that the uterus is retroverted is not in our opinion a reason for replacing it.

The state of the patient, whether unmarried or married, and nulliparous
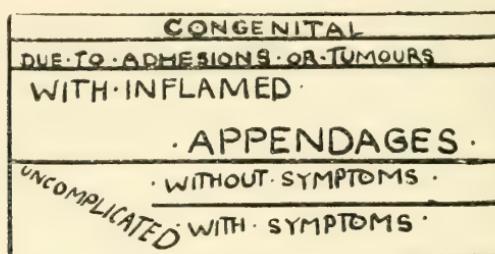
FIG. 8.—DIAGRAM SHOWING THE VARIOUS CONDITIONS FOUND IN CASES OF BACKWARD DISPLACEMENT.

or a multipara, has also a bearing on the proper handling of the case. If a retroverted uterus be noted on rectal examination in an *unmarried* woman, it is of no account and nothing need be said to the patient regarding it. In the case of the *married nullipara*, it also rarely calls for replacement. The probability is that it is congenital, and, while the condition may be explained to the patient, here also it should be regarded in most cases as of no account in order that she may not be led to think of the condition of the pelvic organs. If there is dysmenorrhoea, the treatment for that is not connected with the position of the uterus (see p. 12), and the same may be said of the treatment of sterility by dilatation. In the *multipara*, retroversion is a frequent condition. Often it is present without symptoms; conception takes place, and the retroverted uterus rights itself in the early weeks of pregnancy. Where the patient has symptoms, the relation of these to the position of the uterus calls for careful investigation.

Having studied the case with a view to treatment, this consists in the

reposition of the uterus and its retention in proper position by a pessary, or by operation.

Given a mobile uterus, it may be replaced by three methods—(1) By

FIG. 9.—BIMANUAL REPOSITION OF RETROVERTED UTERUS—FIRST STEP.

FIG. 10.—BIMANUAL REPOSITION OF RETROVERTED UTERUS—SECOND STEP.

bimanual manipulation; (2) With the sound; (3) By genu-pectoral posture, combined with traction by volsellæ.

(1) **Bimanual Manipulation.**—With the fingers in the posterior fornix, first push the fundus upwards (fig. 9), then place the index in the anterior fornix and push the cervix backwards so as to swing the body forwards (fig. 10), and at the same time place the fingers of the left hand on the abdomen so as to get behind the fundus and bring the uterus to
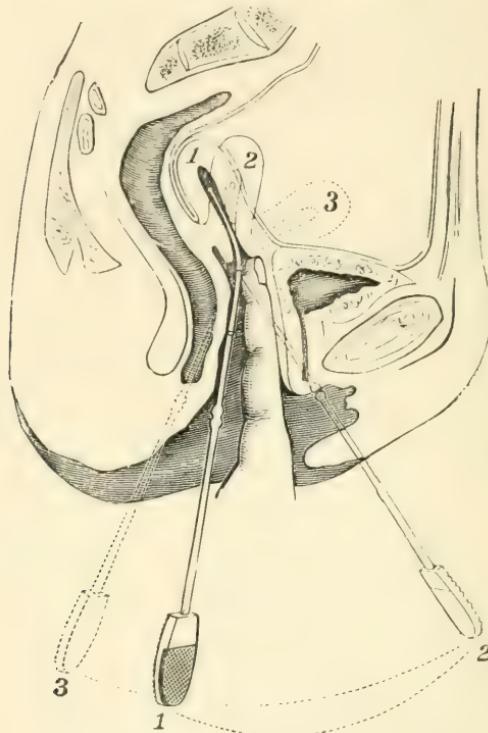
Fig. 11.—Replacement of the Uterus with the Sound.
1, 2, 3. The successive positions of the Sound and of the Uterus.

the front bimanually. This manipulation, easy when the abdominal walls are thin and relaxed, is difficult when the patient strains or has fat abdominal walls. In such cases anæsthesia may be necessary.

(2) The method of **replacement with the sound** will be evident from fig. 11. Pass the sound as seen at 1, then carry the handle round in a curve to position of 2 ; the rough surface of the handle, which looks backward in 1, looks forward in 2. Then move it directly backwards to 3. The uterus being thus replaced, the sound is withdrawn and a pessary introduced. Reposition by the sound, a favourite method before the

sterile character of the uterine cavity was appreciated, is now replaced by the bimanual. It is useful, however, in fat patients, but must be employed with aseptic precautions.

(3) If there is reason to think that the retroverted uterus is pregnant, place the patient in the **genu-pectoral posture** and push the uterus forwards by means of the finger in the vagina, or better still, in the rectum (see fig. 12). This is aided by laying hold of the anterior lip of
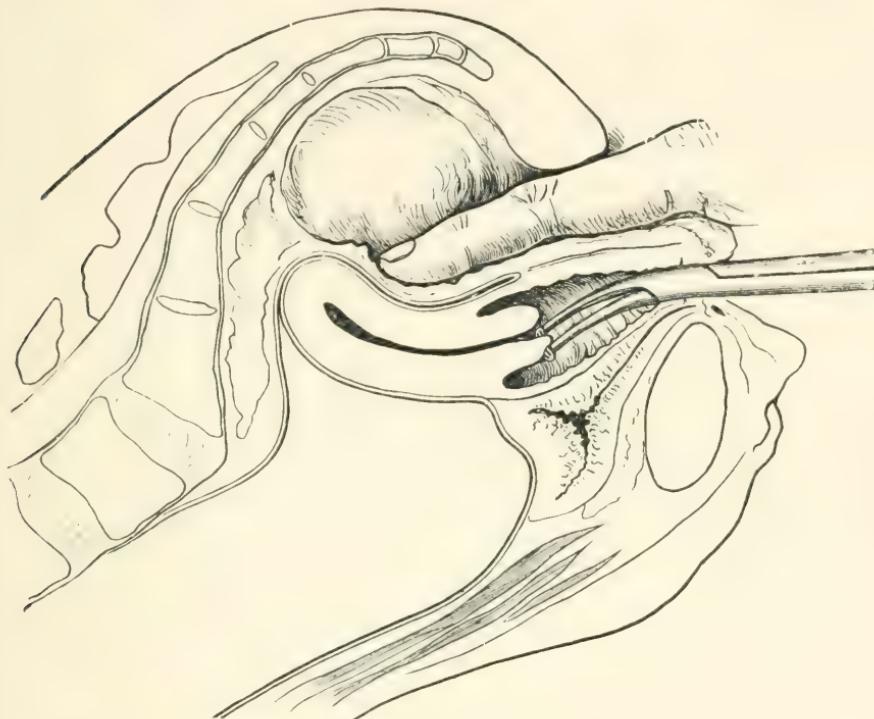
FIG. 12.—REPLACEMENT OF THE UTERUS IN THE GENU-PECTORAL POSITION WITH THE VOLSELLA AND PRESSURE ON THE FUNDUS THROUGH THE RECTUM.

the cervix with a volsella and drawing it downwards and backwards, which brings the fundus more within reach of the finger and the uterus is swung round.

The retention of the uterus in its normal position is effected by pessaries. Of these the best form is the Hodge or, its modification, the Albert Smith.

The *material* of which they are made is vulcanite, which is light and smooth and not affected by vaginal discharges. To bend the vulcanite,

the pessary should be placed in hot, almost boiling, water. It is thus made pliable and can be moulded to the desired form, but becomes firm again on placing it in cold water ; this is also effected by oiling the pessary and heating it in a spirit lamp. Pessaries are also made of gutta-percha, which has the advantage of being easily moulded ; these cannot, however, be worn for a long time, as the gutta-percha is absorbent, and, retaining the secretions, sets up irritation. The patient can wear one for a few weeks till we see that it fits comfortably and is effective, and then we can substitute one of a similar form made of vulcanite. Celluloid and aluminium pessaries are sometimes used instead of vulcanite ones.

The *form* of the Hodge is an elongated horseshoe, with a straight transverse bar joining the free ends. Seen from the front (fig. 13), it
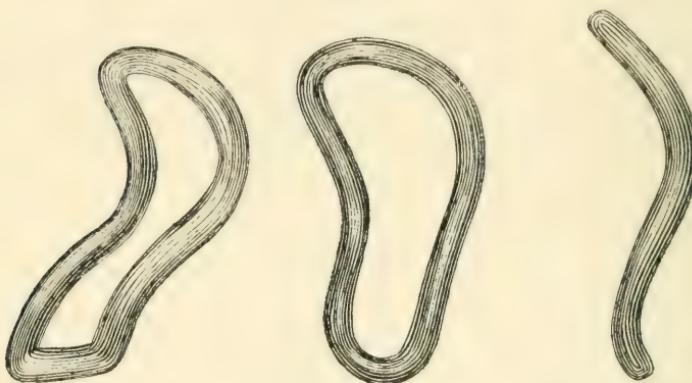
FIG. 13.
HODGE PESSARY.

FIG. 14.
ALBERT SMITH PESSARY.

FIG. 15.—SIDE VIEW OF ALBERT SMITH PESSARY. The Hodge is similar, but has the lower curve less marked.

has a curved upper end which is adapted to the posterior fornix ; the lower end consists of a straight bar which serves to keep the sides apart, and lies under cover of the symphysis pubis ; the external angles of this end are rounded to prevent their cutting the vagina ; the sides run almost parallel. Seen from the side, it is a mould of the vaginal slit ; there is an upper sacral curve, which is long and well marked ; there is a lower pubic one, which is not necessarily present or is only slightly marked. The pessary lies so that the concavity of the sacral curve looks forward—that is to say, the upper end of the pessary (like the posterior fornix vaginæ) curves forwards. The Albert Smith (fig. 14) contracts in its lower half to a more or less beak-shaped end ; seen from the side, it has the pubic curve more marked (fig. 15). Scientifically it is the

more correct form, because the posterior wall of the vagina is narrower below than it is above.

The *choice of an instrument* suitable to the case must be made. The pessary should not be larger than the posterior vaginal wall, so that it produces no tension when it is in position. The upper bar should be of such a size that it can be passed in easily ; the lower should be narrower than the upper, but not too narrow to protrude through the
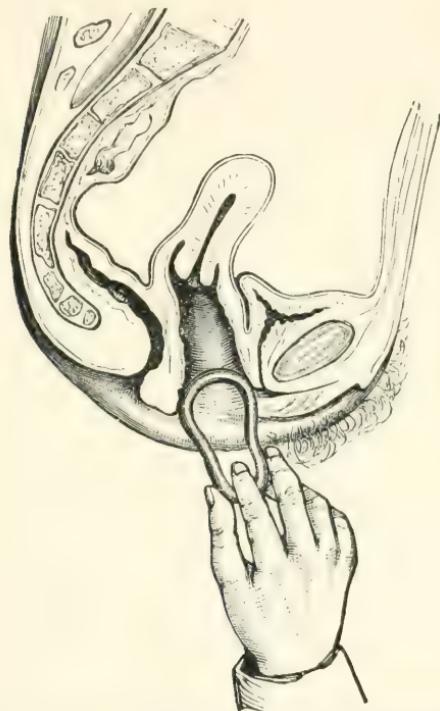
FIG. 16.—INTRODUCTION OF PESSARY—FIRST STAGE.

vaginal orifice. The proof of a good fitting instrument is that it keeps the uterus in position and that the patient is unaware of its presence.

The *mode of introduction* of the pessary demands special attention. It is important that this apparently simple manœuvre be effected without causing pain to the patient. From the fact that the vulvar orifice is antero-posterior, while the cavity of the vagina is transverse, the instrument must be introduced with its flat surface horizontal (the patient is supposed to be on the side) and afterwards rotated so that this comes to be vertical. From the position of the cervix, the instrument is very liable to run into the anterior fornix. When in position, the upper end

curves forwards.   Having oiled the instrument, grasp it with the lower
end (the square end in the case of the Hodge, the narrower end in the
case of the Albert Smith) between the finger and thumb of the right
hand.   Separate the labia with the first and second fingers of the left
hand ; when the vaginal orifice is narrow, hook back the fourchette with
one finger or get the posterior corner of the end which is being intro-
duced within the vaginal orifice, and press back the perineum with it
so that the anterior corner is not pushed against the clitoris or vestibule.
Now push the pessary backwards in the axis of the vagina till it is half
within the cavity (see fig. 16), and rotate it so that the concavity of the
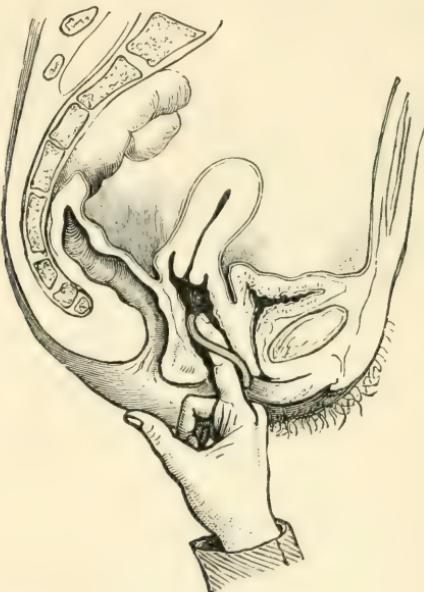
FIG. 17.—SECOND STAGE—PESSARY CARRIED ON BY FINGER.

sacral curve looks forwards.   Pass the index finger behind the instrument
into the vagina, and place the tip of it against the upper bar ; carry the
pessary onwards, keeping the upper bar well against the posterior vaginal
wall to prevent its slipping up in front of the cervix (fig. 17).
     The *position and action* of the pessary when *in situ* are as follows.
It lies exactly adapted to the vaginal walls (fig. 18) ; the upper end
being in the posterior fornix behind the cervix, the lower just within
the vaginal orifice.   It is kept in position through its resting on the
oblique anterior face of the sacral segment of the pelvic floor, against
which it is compressed by the posterior face of the pubic segment.
     The student will readily understand and remember the position of

the pessary in the following way. Hold the hand inclined as in fig. 19, with the fingers slightly flexed. It resembles the posterior vaginal wall
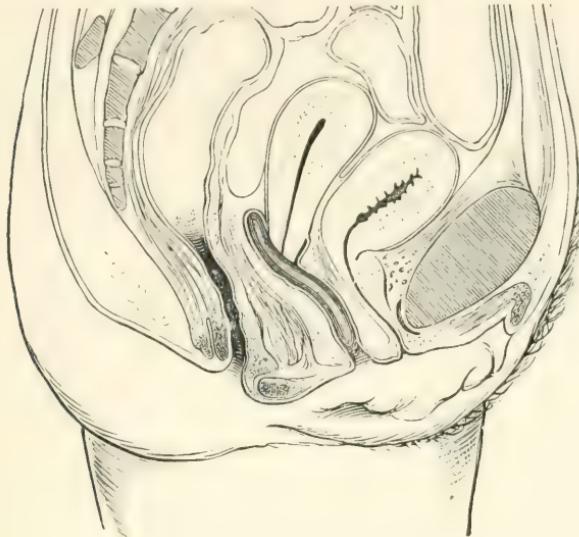
FIG. 18.—POSITION AND ACTION OF PESSARY.

FIG. 19.—HAND HOLDING ALBERT SMITH PESSARY.

in the following points: (1) It is broader above than below; (2) it curves forwards above; (3) from its obliquity, it allows the pessary to

sit on it. Now place the pessary on it. It will only lie adapted to the hand when the broad end is above and the upper curve is directed forwards.

Its action is that the *upper bar gives a point d'appui to the posterior fornix.* The posterior vaginal wall runs round the upper bar as on a pulley, and, as it is inserted into the cervix, the latter is thereby drawn upwards and the fundus thrown forwards (fig. 18). The pessary, therefore, has the same action as the utero-sacral ligaments, if we suppose that these keep the cervix backwards. This is only the action in the case of a retroverted uterus which has been replaced. A vaginal pessary, however, gives relief even though we may not be able to replace the uterus. In this case we may suppose that it acts by supporting the uterus as a whole, thus diminishing tension on the ligaments.

The after-watching of the case is important. The patient should be told to return in two days to see that the instrument is in place and keeps the uterus in position, and to return at once if it causes pain. After this she should report herself occasionally, say at intervals of three months, when examination is made to ascertain that the uterus keeps its place. If she uses a douche occasionally, it is not necessary to remove the instrument more frequently to clean it. After the pessary has been worn for some months, it is removed to see if the uterus remains in position, or if the patient is comfortable without it, whatever the position of the uterus may be. Should conception occur, the pessary may be worn till the fourth month, after which the uterus rises above the brim and there is no longer reason to fear displacement.

Can retroversion be cured by pessary treatment? Only if it be discovered and treated within some months after delivery. Hence the importance of examining patients after the puerperium. How long should a pessary be worn? As short a time as possible compatible with the patient's comfort. This, not the position of the uterus, is our guide.

Treatment by Operation.—There is probably no subject in operative gynecology on which so much has been written during recent years, unless it be the extirpation of the uterus for fibroids or malignant disease. While the latter operation is of first importance, as it implies the saving of life, the value of the former is more difficult to estimate, as it concerns the relief of suffering into which the personal equation largely enters. The causal connection between the displacement and the symptoms is in many cases open to question. That benefit follows an operation does not prove that the displacement was the cause, as it might be accounted for in another way, *e.g.* by the psychical effect of the operation. It is just in operations done to relieve reflex pains that there is most room for this effect. They have this advantage, however, that they set the patient free from the necessity of wearing a pessary— a great boon to patients of the working class.

Three methods of fixing the replaced uterus have been employed, which may be described as vaginal fixation, ventral suspension and fixation, and shortening or fixation of the round ligaments.

In *vaginal fixation* the anterior surface of the uterus is stitched to the anterior vaginal wall or to the peritoneum covering the bladder. As the sutures are removed or absorbed there is no direct union but simply through adhesions. The operation is done from the vagina, through an incision in the anterior fornix. A favourite one in Germany, it has never been taken up in this country.

Ventral suspension and ventral fixation.—In *suspension* the uterus comes to be suspended by adhesions from the abdominal wall; in *fixation* it is fixed to the abdominal wall denuded of its peritoneum. To produce adhesions the uterus may be stitched to the abdominal wall by catgut sutures, uniting the superficial tissue of the margins of the uterus to the peritoneum and subjacent tissue of the abdominal wall; the abdominal wound being subsequently closed in the usual manner. Or the sutures used to close the wound may be passed likewise through the anterior surface of the uterus. To cut off infection from the skin, the sutures which pass through the uterine wall may stop short of the skin, and thus be buried when the abdominal incision is closed. In ventral fixation the peritoneum is removed and the uterus plastered to the abdominal wall.

All of these methods are open to the objection that adhesions stretch in time, that a loop of the bowel may get caught in them, and that they may affect the position of the uterus or its expansion in a subsequent pregnancy. Instead of adhesions, it is better to make use of a natural structure to suspend the uterus. And though the round ligament has little to do with keeping the normal uterus in position, it has proved of great service to the operating gynecologist in bringing back a displaced uterus to position. In fact, the best methods of doing this ring the changes on various methods of shortening the round ligaments.

Shortening and fixation of the round ligaments.—This was first done at the external abdominal ring. First suggested by Alquié to the Académie de Médecine in 1840, it has been called the Alexander-Adams operation, after the two British operators who reintroduced and elaborated it. The external abdominal ring is cut down on as in operating for hernia, the round ligament isolated and drawn out for 2 or 3 inches, cut off, and the cut end stitched to the pillars of the ring. As the abdominal cavity is not opened into, and it is thus a minor rather than a major operation, it was for many years popular and still is with some surgeons. The risk of abdominal section is now, however, discounted, and it enables the operator to see the condition of the appendages and deal with them. In cases of retroversion with symptoms, the latter are due to the appendages, not to the position of the uterus; and we shall

describe under Gynecological Operations the best method of dealing with the retroversion, by pulling a loop of round ligament through a new canal made in the abdominal wall and stitching the loop to the fascia over the rectus. Some speak of this operation also as a ventri-suspension.

PROLAPSE OF THE UTERUS.

Treatment of prolapse is by pessary or operation.

Treatment **by pessary** has fallen into the background since operative treatment has been elaborated. It still has its place, however, if patients decline operation or there are other reasons for not operating.

The action of a pessary for prolapse is different from that for retroversion. The latter acts as a splint, stiffening the vagina and, by pressure on the posterior fornix, drawing the cervix backwards ; and the pessary is adapted to the form of the vagina, and does not disturb
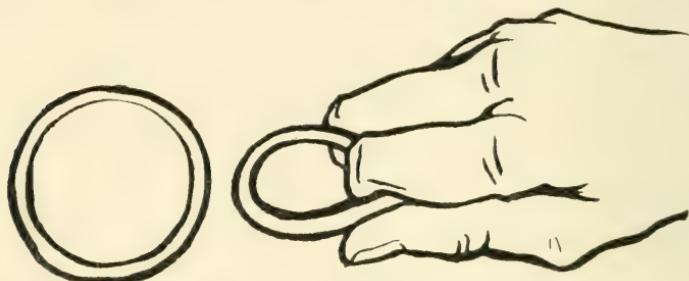
FIG. 20.—RING PESSARY.   FIG. 21.—RING PESSARY COMPRESSED
                                    FOR ITS INTRODUCTION.

anatomical relations (see fig. 18). A pessary for prolapse, usually a ring (fig. 20), alters the form of the vagina, making it broader from side to side than it is at the outlet, and thus counteracting the eversion of the vagina which occurs in prolapse. For ease in introduction this ring is compressible, and is usually made of watch-spring covered with rubber.

To introduce a ring pessary, after placing it in warm water to soften the rubber, dry the pessary, grasp it between the finger and thumb of right hand (fig. 21), apply some antiseptic vaseline to the fore part of it with the fingers of the left hand, separate the labia with the same fingers, introduce the pessary till the broadest part is within the vulva. The fingers of the right hand are now introduced to hook the upper part of the pessary into the posterior fornix so that the cervix falls into the ring. When wearing a rubber ring the patient should douche daily, and report herself once a month to have the pessary removed, cleansed and replaced.

If a vulcanite ring is used, as this is not compressible, the perineum must be drawn forcibly back with the fingers of the left hand until there is room for the ring to be pushed in with the right. In introducing this, as in all pessaries, the instrument must be pressed against the less sensitive edge of the perineum; pressure against the more sensitive vestibule causes the patient pain. A vulcanite ring may be worn for two or three months without being taken out to be cleansed.

In marked cases of prolapse where the prolapsed part does not 'go back' when the patient lies down, it must be replaced; and in the reverse order to that in which it has come down. In prolapse the anterior vaginal wall comes down first and from below upwards, then the cervix, and the posterior vaginal wall from above downwards. In replacing it, pressure is made first on the anterior vaginal wall; then the cervix is pushed up, which, as it slips in, pulls the posterior wall after it.

To grasp the rationale of the *Operative Treatment of Prolapse* of the uterus, we must recall what is said in 'Gynecological Diagnosis and Pathology' as to its etiology :

'During recent years, as a result of anatomical research and of observations made by operators, our ideas regarding the causation of these uterine displacements have undergone considerable modification. The chief supports of the uterus used to be thought to be the broad and round ligaments slinging the organ from above and the levator ani muscles forming a support below. Now we have come to recognise that the fascia and connective tissue surrounding and attached to the uterus, cervix and vagina, and the fascial coverings of the rectum and bladder play a much more important part, and that they constitute the real support of the organs. The lower part of the body of the uterus, the cervix and vagina, are embedded in a matrix of connective tissue, through which run the arteries, veins, nerves and lymphatics which supply these organs. Round the blood-vessels this tissue is specially condensed in the form of vessel sheaths, and these sheaths run into the uterine, cervical and vaginal walls along with the vessels; and from their attachment on the other hand to the side wall of the pelvis, they constitute the real support of these organs. The mass of connective tissue which surrounds the uterine vessels, as they run from the side wall of the pelvis to the lateral aspect of the lower uterine segment at the base of the broad ligaments, has been dignified by the special name of the transverse cervical ligament (ligamentum colli). It is not really a ligament in the ordinary sense of the word, but simply a specially condensed part of the general connective tissue of the pelvis. The part which this connective tissue plays in the support of the uterus is very well demonstrated in the course of the operation of vaginal hysterectomy. In performing this operation the operator always notes

3

that the cervix cannot be pulled down very far until the uterine vessels have been divided, and along with them the so-called transverse cervical ligament. Underneath this tissue and above the levator ani muscles is a layer of fascia, which is attached to the side walls of the pelvis and to the vagina, bladder and rectum. It is continued over both of the latter organs and constitutes their chief support. The levator ani muscles are at a low level, and support the vaginal, vesical and rectal walls, and so indirectly support the uterus and other pelvic organs higher up. We thus see that the chief support of the uterus is at a higher level than the levator ani muscles. Injury to these muscles will result in a lack of support to the vagina, rectum and bladder, and lead to sagging of these structures; and, if the fascia over them has also been weakened or torn, to rectocele and cystocele. A certain amount of sagging of the uterus will also occur with possibly retroversion or retroflexion; but no prolapse of any marked degree can take place until the connective tissue supports higher up have given way, either as the result of this constant drag or of a direct injury to them during labour. . . .

'Displacement of the pelvic organs may result from laceration or over-stretching of the levator ani muscles. The prolapse in such a case will be of slow occurrence, and may never become very pronounced, provided the supporting structures at a higher level are able to withstand the extra strain put on them. The uterus will probably descend sufficiently to become retroverted or retroflexed. If the pelvic fascia and connective tissue above the levator muscles are torn or strained, descent of the uterus is certain to occur, and in the absence also of levator support the prolapse will in time become complete.

'Now all these conditions may result from a spontaneous labour. A large head, distending the cervix and lower uterine segment, results in a certain amount of displacement of tissue at the sides of the uterus. All the tissues are soft and œdematous at the time of labour. If proper restitution does not take place during the period of involution, or if any extra strain is thrown upon the tissue in the puerperium by a large heavy uterus being permitted to remain in a position of retroversion, a return to their normal tension is unlikely, and a permanent displacement may result. An extensive tear of the pelvic floor, involving the levator ani muscles, may occur in the course of delivery. In the second stage of labour the anterior lip of the cervix may be pushed down in front of the head, putting a great strain on the fascial supports of the uterus and on the bladder fascia, possibly causing such injury in the latter as to result in cystocele.'

The term 'prolapse' is misleading in so far as it suggests simply a 'falling down' and fixes attention on the uterus. A more suggestive and comprehensive phrase is 'sacro-pubic hernia', which we owe to Berry Hart. This draws attention to *intra-abdominal pressure* as

another important factor in prolapse associated with the separation or relaxation of the pelvic floor and of the tissues above it which keep up the uterus. A prolapse 'goes back' when a patient lies down, because the intra-abdominal pressure is relaxed; and, like a hernia, is forced out on straining movements, e.g. coughing. Further, we might compare the pillars of the ring through which the inguinal canal passes to the cleft in the pelvic floor produced by the passage of the genital canal.

The operative treatment to be described under Operations includes 'Repair of the Perineum' and 'Colporrhaphy'; and these terms, dating from a period before the supports of the uterus were studied, may be retained, provided we understand what is implied. Repair of the perineum, in the treatment of prolapse, aims at bringing together the fascia and levator ani : the buried catgut sutures are the essential part of the operation. 'Colporrhaphy' (from *colpos*, the vagina, and *raphé*, a seam) is not merely 'taking in a reef' in the vaginal wall to contract the canal, but aims at bringing together the fascia underneath the wall. Posterior colporrhaphy that behind the vagina : anterior colporrhaphy that in front of it, the fascia which grasp the bladder and the vagina anteriorly.

With these operations to increase the support of the uterus, there is sometimes combined amputation of the cervix, to reduce the size of the uterus when it is markedly enlarged.

PELVIC INFLAMMATION.

'To this class belong a large proportion of the population of sofa, bath-chair, nervous, debilitated, dyspeptic females, who wander from one medical man to another, and who crowd our watering-places in summer; most of them are suffering from chronic uterine inflammatory disease unrecognised and untreated, and most of them would, if their disease were only discovered and cured, become amenable to the resources of our art, and eventually recover their health, spirits, and powers of locomotion. It is a singular and instructive fact that amongst the male part of the community there is no similar invalid population, always ill, unable to walk or ride, constantly requiring medical advice, and yet living on from year to year, neither their friends nor themselves knowing what is amiss with them, beyond the evident weakness, dyspepsia, etc.'

Such is Bennett's witty description of the effect of protracted pelvic inflammation before the days of gynecological pathology, accurate diagnosis and rational treatment.

While for the sake of a pathological basis on which alone exact diagnosis rests we speak of vulvitis, vaginitis, cervical catarrh, endometritis and metritis, and of inflammation of the uterine appendages, peritonitis and cellulitis, the clinical picture is usually that of an ascending inflammation, due to infection, affecting the various areas of the genital tract. We say usually, because sometimes the infecting organism comes by way of the peritoneum from the intestine or through the circulation. The clinical picture varies with the nature of the infecting organism, the circumstances of the invasion, and the anatomy of the structures involved. Each of these calls for reference.

1. The infecting organisms are those of sepsis, especially the streptococcus; the gonococcus, and the spirochæta pallida; and the tubercle bacillus.

2. As to the circumstances of the invasion, it dates from an abortion or labour, or from exposure to gonococcal or syphilitic infection or the development of tuberculosis. Considering the proximity of the intestine to the pelvic organs and especially of the anus to the vulva, it is remarkable that the bacillus coli is not more often in evidence. That the bacillus coli is sometimes a cause was demonstrated by a case of acute puerperal sepsis in which we operated on the second day and found the bacillus coli in both tubes. In the management of a midwifery case and in gynecological operations preventive treatment demands that in cleansing the parts swabs be passed from before backwards (from vulva to anus) and after touching the perineum be thrown away. The importance of the bacillus coli in Gynecology is seen also in ascending infection of the

urinary tract involving the kidney ; and examination of the urine for
this organism will clear up some obscure cases of pain in the loins.

Invasion by the gonococcus and spirochæta pallida belongs to the
the treatment of venereal disease. Here we only mention that the
gonococcus penetrates most easily the ducts of the Bartholinian gland, caus-
ing swelling of the labia, the mucosa of the urethra—urethritis, and of the
cervix—cervical catarrh. The symptoms of affection of the appendages
in chronic cases come some weeks later, or not for months. Besides pyo-
salpinx, the most serious consequence is the adhesive peritonitis which
plasters down the tubes and ovaries, producing absolute and incurable
sterility.

Invasion by the tubercle bacillus is comparatively rare, and the
circumstances of onset often so obscure that diagnosis is difficult. A
clue may be given by a chest condition, or something in the appearance of
the patient or her surroundings, which makes one think of tubercle.
Invasion takes place usually through the blood-stream from a distant
focus in the lungs or tuberculous glands. The area of the genital tract
attacked is the Fallopian tubes, and the treatment is their removal by
abdominal section. Cases of invasion from below through coitus, or of
involvement by extension from a tuberculous peritonitis, and of its appear-
ance, first in the cervix or endometrium, are so rare that they need only
be mentioned.

3. The effect that the histology of the tissues has on pathological
changes comes out in *chronic* cases. And the nature of these changes
has a bearing on treatment. It is of interest to compare the different
areas of the tract.

The *vagina* resembles skin rather than mucous membrane, and the
changes in vaginitis are not those of a catarrhal mucosa. The leucorrhœal
discharge comes in great part from the cervix. The mucosa of the genital
tract begins at the os externum. Here also is the bacteriological barred
gate : above this the tract is sterile. Below it micro-organisms abound :
not pathogenic, except in the lower third of the vagina ; because the
normal vaginal secretion, which is acid in contra-distinction to the alkaline
secretion of the cervix and endometrium, destroys pathogenic organisms.
Its acidity is due to the vaginal bacillus, which acts like the bacterium
lactis in the souring of milk.

The *cervix* is a gland secreting alkaline mucus to lubricate the vagina.
When its mucosa is inflamed, there is a catarrh analogous to the catarrh
of other mucous membranes. Associated with this are changes outside
the os externum, which, from the fact that they can be seen by means of
the speculum, are of value in the diagnosis of cervical catarrh. These red
catarrhal areas round the os are of the nature of an adenoma. Under treat-
ment by antiseptic and astringent douches, the squamous epithelium of
the vaginal portion may be seen creeping in again and 'reclaiming' the

red catarrhal adenomatous area (fig. 22). This healing process resembles the creeping in of the skin over an ulcer; and gave colour to the erroneous view which described this adenomatous area as 'ulceration' and 'erosion'.

The *endometrium* is not a mucous membrane, if by that is meant an area whose function is to secrete mucus; and its pathology bears this out. It contains mucous glands, but the characteristic histological element, the essential element, is not the glands but the interglandular connective tissue. The student should read again the account of the histology of the mucosa given at pp. 79 to 84 of 'Gynecological Diagnosis and Pathology', and of the changes it undergoes in menstruation and in pregnancy, if he is to understand its pathological changes and to have the
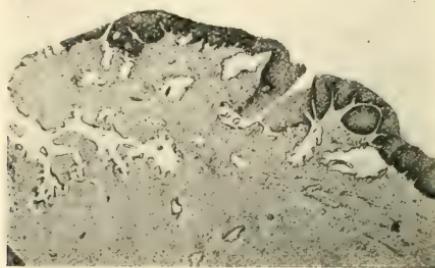

FIG. 22.—CATARRHAL PATCH UNDERGOING CURE.

The squamous epithelium has crept in over the catarrhal area so that cervical glands are seen under the thick epithelial covering. If the mouths of these glands are blocked, Nabothian follicles form.

key to their treatment. The significance for treatment of the new stand-point which affirms that 'the function of menstruation must be looked upon as a process for renewing the various histogical elements of the mucous membrane; these elements, especially the stroma cells, are of embryonic type and as such have only a short life' is worthy of note. The histology of the mucosa is seen to be related to the functions of child-bearing. Its function is not to secrete mucus, but to *form a decidua*. When the decidua forms, the glands fall into the background. They persist through pregnancy in the spongy layer of the decidua, but only as storehouses of epithelium from which the surface covering of the uterine cavity may be restored when the *decidua* is cast off (hence its name) in labour and the first days of the puerperium. When we speak of the uterine mucosa the use of the term mucous membrane makes us think of it as analogous to, say, the stomach or the bladder; but a moment's consideration will show that there is no analogy. While these organs are, so to speak, constantly in use, the function of the uterus is only performed at long intervals, and

when it comes to distend and expel its contents it does not act like the bladder. Anatomical changes occur in the walls to make it an expulsive organ, to fit it, if one may use the expression, for its work, *i.e.* labour. In considering uterine inflammation, therefore, we must bear in mind that the uterus differs functionally from other organs lined by mucous membrane, such as the stomach or bladder. These are in constant use, while the reproductive function is only occasional. We must be careful, therefore, not to transfer to the uterine mucosa ideas of inflammation derived from other mucous membranes, as was done before the examination of fresh material derived from the operating table had enabled the pathologist to examine the changes in the endometrium and muscular wall of the uterus. Such ideas survive in terminology—in the termination 'itis', which suggests 'inflammation'.

The *Muscular Wall* of the uterus. What about 'Chronic Metritis', *i.e.* the changes in the muscular wall which produce permanent enlargement of the uterus, the *bête noire* of the gynecologist? To describe the increase in the connective tissue of the uterus, the term 'fibrosis uteri' has come in, and is an adequate description of some cases of permanent uterine enlargement—that is to say, of those cases, usually over forty years of age, with intractable haemorrhage as a symptom, and which come to the practitioner and then to the gynecologist for hysterectomy. The more frequent condition seen in general practice, however, is that of a large heavy uterus in a patient who has had one or more children, and with other symptoms, such as pelvic discomfort or bearing down, and secondary digestive derangements. Until our pathological knowledge is more definite we prefer to fall back on the clinical term introduced by J. Y. Simpson, of 'subinvolution'. It covers the greater number of the cases, draws attention to their origin in the puerperium, and suggests the most efficient line of treatment—the removal of all causes that interfere with the involution of the uterus. The increase of elastic tissue when the condition has arisen during the puerperium explains how these cases do not respond to treatment. Once fibrous or elastic tissue has been produced, there is no means of removing it : it is difficult to reduce a uterus thus enlarged by treatment. It can only be removed by 'involution'—that is to say, the only complete cure is another pregnancy with a properly managed puerperium.

In the *Fallopian tubes* we again come on an area with a secretion, or transudation, which has the special function of washing down the ovum to the uterine cavity in a current set up by the ciliated epithelium. The tube has a mucosa and there is a 'chronic salpingitis', but recognisable only through its results. When the secretion cannot escape, the tube becomes distended, taking the form of a retort-shaped swelling, the neck of the retort springing from the uterine cornu (fig. 23). Its characteristic form is determined by the anatomical shape of the tube. It is not a tube

in the usual sense of the word. Falloppius called it 'uteri tuba' from its resemblance to the *tuba* or brass trumpet of the Roman soldier, with its straight mouth-piece, horn-like curl and wide orifice. We owe its name to the picturesque mind of the great anatomist who first described it.

The *ovary* in acute inflammation, seen in acute septic and gonorrhœal cases, undergoes general enlargement. In chronic cases the characteristic changes are not of the nature of inflammation but secondary to it. The cystic ovary is produced by the distension of follicles whose rupture has been prevented by thickening of the surrounding tissue.

When the *peritoneum* is involved, peritonitic bands and adhesions are produced. These are related to inflammation of the appendages, and the

FIG. 23.—PYOSALPINX.

The uterus has been removed along with the tube and both are viewed from the posterior aspect. Note the thinness of the uterine end of the tube as compared with the widely dilated outer end, giving typical retort appearance.

disastrous results are best seen in cases of gonococcal invasion. Cellulitis, on the other hand, is related to tears in labour, notably of the cervix, which literally open the door to the streptococcus. It should be noted that the exudations present in peritonitis and cellulitis are beneficial. They are the earthworks thrown up to aid the leucocyte in holding up the invasion of the streptococcus.

So much for the anatomy of the areas involved in an ascending invasion. The route taken by the invader, according as it is the gonococcus or streptococcus, is of interest (see fig. 24). The mucosa of the genital tract forms a pathway from skin to peritoneal cavity, and it is along this road that the gonococcus advances, while the streptococcus also strikes into the tissue. If we compare the genital tract to a fenced road, with dense tickets of undergrowth on either side, the gonococcus keeps to

the beaten track while the streptococcus, availing itself of gaps in the fence—
the lacerations of labour—plunges into the wood along the paths of the
lymphatics and blood-vessels.

From this brief survey of inflammation in relation to infection two
facts stand out. The genital tract is a pathway from skin to peritoneum,
on which the bacteriological gate is at the os externum. Peritonitis is the
final stage, and its frequency in the female is due to the existence of
this path.

And the bearing on treatment is obvious. The only adequate treat-
ment is preventive. Once infection is started one may try to diminish it
by antiseptic douching of the vagina or uterus, or by antiseptic applica-

FIG. 24.— ROUTE TAKEN BY GONOCOCCUS (G) AND STREPTOCOCCUS (S).

Gonococcus keeps to surface of mucosa of tract till it reaches peritoneum
(p). Streptococcus also strikes into tissues of cervix and uterine wall,
and into broad ligament.

tions to the vagina or uterine cavity. In removing septic matter from the
uterine cavity, we must remember that the curette ploughs up the ground
and scatters afresh the seeds of sepsis; hence the advantage of using the
finger rather than the curette in clearing out septic material from the
uterus in cases of incomplete abortion. Septic accumulation in the tubes
may be removed by abdominal section. Much also may be done in acute
cases to keep up the patient's strength and spirits till the 'vis medicatrix
naturæ' has asserted itself.

Up to the present time, attention has been specially directed to the
germs of infection. The soil and the weather, however, are more in the
farmer's mind than the seed; and the medical mind will dwell more on
the state of the tissues and the resistant powers of the individual.

Passing now from this survey of the origin and spread of infection in the genital tract, we consider the treatment of its manifestations in the various areas from the vulva upwards. And it is convenient to consider, along with the treatment of them, that of other conditions which do not belong to the group of inflammations. Reference must also be made to difficulties in connection with sexual intercourse, known as Dyspareunia.

AFFECTIONS OF THE VULVA.

Under these we consider vulvitis, Bartholinian cyst and abscess, pruritus vulvæ and the conditions causing it.

Vulvitis in its acute form is seen in some cases of puerperal sepsis and as a rule in gonococcal infection, and its treatment is part of the
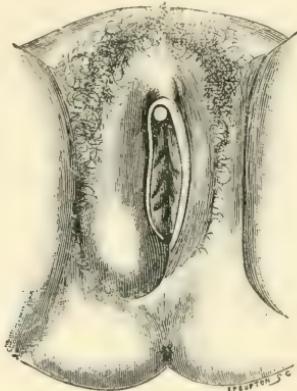

FIG. 25.—ABSCESS OF THE BARTHOLINIAN GLAND.

treatment of these. Gonococcal infection causes obstruction of the duct of the Bartholinian gland, and the dilated gland forms a swelling in the labium (fig. 25), causing pain in walking and sitting. Great tenderness and redness point to suppuration. A *Bartholinian cyst or abscess* may also result from a simple inflammation, and is no proof of gonorrhœa. Once present it is apt to recur unless the cyst wall is excised or destroyed. If there is no suppuration, it is shelled out like a wen. If there is, and the wall is adherent, lay it freely open, apply pure carbolic to the cyst wall, pack the cavity and keep it open till it heals by granulation. The cautery has this advantage over the knife that it lessens septic absorption and can be used to destroy the cyst wall.

By **pruritus vulvæ** is meant a feeling of discomfort or irritation at the vulvar orifice. It is only a symptom of a great variety of conditions which call for careful investigation. And the mistake is often made of treating it by local sedative ointments instead of ascertaining and remov-

ing the cause. It is a distressing complaint, as the scratching to obtain temporary relief only makes it worse by producing changes in the skin which add to the patient's distress. She avoids company to seek relief, and this, with the continued irritation, induces nervous depression.

The cause of the irritation may be found in the urine, in irritating vaginal discharges, in a condition of the skin such as eczema or parasites in the pubic hair, in accumulation of white secretion round the sensitive clitoris, rarely in red tender points or patches round the vaginal orifice. It is frequent in dispensary patients due to want of cleanliness, it is sometimes related to menstruation and pregnancy, and is worst in fat patients during hot weather.

In investigating a case, the age of the patient is noted, as it is more common in elderly patients; also when the irritation is worst, e.g. at the menstrual period. Then careful inspection is made not only of the vulva but of the vagina just within the vaginal orifice. The speculum is necessary to determine the source of an irritating discharge. And finally the urine is tested to exclude hyperacidity and especially glycosuria as a cause. Unless such a thorough investigation is made, the real cause may be overlooked and treatment fail. Here, as in many gynecological cases, the practitioner is apt to be misled by finding some too obvious lesion which attracts his attention and to which he directs treatment, while the real cause lies deeper.

As regards the *treatment* of cases where the cause is in the *condition of the urine*, carbonate and acetate of potash are indicated in hyperacidity. *Glycosuria* occurs in elderly patients, and is not uncommon as a transient condition about the menopause, but careful watching of the urine is required to exclude diabetes. In these slight cases, dieting is not called for. The application of ointments of bismuth or oxide of zinc to the vulva, and the administration of opium or codeia for some weeks will soothe the patient and lessen the excretion of sugar.

Where secondary to an *irritating vaginal discharge*, it is characteristic of the late stages of cancer, and also occurs in senile vaginitis. In these cases the vulva and entrance to the vagina should be carefully dried after the antiseptic douche and smeared with vaseline. When it occurs *at the menstrual period* it may be due to the acidity of the vaginal discharge after the alkaline discharge of the period. A weak alum douche followed by the application of bismuth ointment lessens the irritation. For *pediculi* in the pubic hair mercurial ointment is useful, but the most satisfactory treatment for this and for cases in which no obvious cause is found is the following. Shave the hair off the pubes and labia and apply tincture of iodine for two or three days over the pubes and inner aspects of the labia until the skin becomes tender. In severe cases it may be necessary to give an anaesthetic and instead of iodine to apply pure carbolic acid. Should this fail, excision of the affected area may be performed, but this is rarely

called for. If there are *red points* or *patches* round the vulva, these are treated with the actual cautery, care being taken to touch only the red points, otherwise troublesome cicatrisation may follow.

Two rare conditions about the menopause call for special note. Sometimes white patches, *leucoplakia*, appear on the labia and beyond— on the perineum and towards the thighs. This is a forerunner of cancer, the development of which is favoured by the patient scratching herself continually. It is therefore important to treat it in an early stage. The patient should take a hot sitz-bath with bicarbonate of soda at night, cleansing the labia thoroughly while in the bath, then dry the parts and apply an ointment of menthol (or cocaine) not only on the vulva, but on a swab within the vaginal orifice. *Kraurosis vulvæ*, an atrophic process which is sometimes seen at the menopause—normal or induced by removal of the ovaries, is treated along the same lines.

DYSPAREUNIA.

Some of the foregoing conditions cause pain on sexual intercourse, or *dyspareunia*, and this is the natural place to refer to this, which is one of the most delicate and distressing conditions in married life. The patient rarely mentions it in the first instance. It is only when the tenderness which he finds on vaginal examination leads the examiner to ask whether she has pain on sexual intercourse, that the patient says that this is why she sought advice. Sometimes reflex contraction of the levator ani causes a spasm of the vaginal canal to which the term *vaginismus* has been applied, as laryngismus is used for a spasm of the laryngeal muscles. Usually there is some local cause which acts reflexly. In some cases there is none, and the only explanation is in the central nervous system, an instinctive dread of married life with absence of sexual feeling to neutralise it. These cases are the worst.

Local causes are rigidity of the hymen, followed by tenderness due to attempts at coitus : in such a case the condition develops gradually and advice may not be sought for some months after marriage. Sometimes the hymen has been ruptured, but tender fissures are present. Or the cause is deeper and tenderness is found only when the examining finger has reached the fornices, due to a tender prolapsed ovary, or utero-sacral cellulitis. The patient should be told that her trouble is not out of the common, and that she should abstain from intercourse, occupying a separate bed during treatment. Application of cocaine, 5 per cent. in vaseline, followed by a hot vaginal douche, will lessen the tenderness ; then the introduction of a glass dilator kept in for some hours after going to bed. If operation is called for, the sensitive bits of the hymen are clipped away—not the whole hymen, it is better to incise the rigid hymen than cut it away leaving a painful cicatrix. The orifice is at the same time stretched by the fingers. Sometimes it is an advantage for the

patient to introduce for some hours at night a glass dilator, as after the operation for atresia (see p. 80). When there is congenital contraction of the orifice, an incision is made *vertically* in its axis and the diamond-shaped raw areas, produced on stretching it, stitched *transversely* by a continuous catgut suture. This increases the calibre of the orifice.

We have described the treatment of a severe case of vaginismus. Slight cases call for a sedative ointment or the introduction of a cocaine pessary, 5 per cent. in cacao butter, a short time before coitus.

VAGINITIS.

In the majority of *acute* cases, independent of the puerperium, vaginitis is gonococcal and requires prompt and careful treatment because of the danger of complications through extension to other parts of the genital tract. The diagnosis should be confirmed by examination of the discharge taken from the cervix or urethra. Discharge from the cervix is taken on a sterile swab, the cervix having been exposed by the speculum. To obtain it from the urethra, swab the urethral orifice, then strip down the urethra by the finger per vaginam, catch the exuding pus on a swab and dab it on a glass slide. Rest in bed, aperients and diluents, and light diet comprise the general treatment.

Under an anaesthetic, douche the vagina with a mild antiseptic—biniodide of mercury 1 in 4000, then swab the vagina and the cervical canal with carbolic in glycerine (10 per cent.) or protargol (10 per cent.), douche again and insert an iodoform plug. The plug is removed the following day and douching continued twice daily till the inflammation subsides. Where the degree of local tenderness is such that douching cannot be tolerated, pain may be relieved by hot hip baths and morphia suppositories. Douching and local application must be continued till bacteriological examination shows that the infection has disappeared. Good results are being obtained by the use, even in the acute stage, of detoxicated vaccines. Protargol should be applied to the urethra also on a dressed sound.

Chronic vaginitis is in many cases also gonococcal. The infection of the vagina is kept up by the contamination of a discharge from a gonococcal endometritis or cervicitis which should in the first place be dealt with. Douching with a saline solution (sodium chloride ʒj to pint) or sulphate of zinc (ʒj to pint) is useful in lessening the irritation by removing the discharge. Medicated pessaries containing ichthyol, iodex, or protargol are also useful, and should be inserted every second night. The vaginal walls may be swabbed twice or thrice a week with silver nitrate (10 grains to ounce) or tincture of iodine. Vaccine treatment is useful.

Simple chronic vaginitis is sometimes due to a badly fitting or foul pessary, which must be removed before treatment by douches. It is also

secondary to some discharge from the cervix. After the menopause, senile vaginitis occurs with senile endometritis and will be referred to when this is considered.

Inflammation of the Cervix is acute or chronic. Acute occurs as part of the process affecting the whole uterus seen in septic puerperal and in acute gonorrhœal cases; the treatment of the latter has been referred to under vaginitis. In chronic cases inflammation may be localised to the cervix, and is known as chronic cervical catarrh.

CERVICAL CATARRH.

Attention is first directed to the patient's *general health*, and disturbances of the digestive system treated as the case indicates. Tonics, such as iron, quinine and arsenic, are useful. Rest from sexual activity is advisable, and can often be secured by recommending that the patient go away from home for a time. In some cases catarrh is only a local manifestation of a general condition such as anæmia or tuberculosis.

Local treatment varies according as the patient is nulliparous or multiparous. In both cases the treatment lasts for weeks.

FIG. 26.—FORCEPS DRESSED WITH COTTON WADDING.

1. In *nulliparæ*, begin with a course of vaginal douches every night, adding to the douche astringents or antiseptics : sulphate of zinc (ʒj to the pint) ; sulphate of alumina or sulphate of copper (ʒij to the pint), or corrosive sublimate (1 in 4000). The action of these on the catarrhal patches has been referred to on p. 37. If the os be narrow, it may be notched bilaterally with scissors to allow the mucus to escape.

If the discharge continues in spite of frequent douching, make a local application to the mucous membrane. Of applications the best are iodine (the tincture or the strong liniment) and carbolic acid, the former in milder and the latter in more severe cases. Iodised phenol, formalin and the other applications to be described under the treatment of endometritis may also be used. In making these applications, proceed as follows. The cervix having been exposed by the speculum, the mucus which prevents the action of the medicament on the mucous membrane is removed by forceps dressed with cotton wadding, as represented at fig. 26. A second pair of forceps, covered merely with a film of cotton wadding, is now dipped into the medicament and applied to the surface. Should the canal be narrow, a sound dressed as for endometric applications (see fig. 27) is preferable. Take care that there is no free drop of the solution on the cotton wool, which might fall on the vaginal mucous membrane ; after

the application is made, place a pledget of gauze below the cervix to catch the acid that might run down.

Rarely in nulliparæ is the pathological process so extensive as to require operative means for removing cervical tissue. In gonorrhœal cases the most useful applications are silver nitrate 1 per cent. or protargol 10 per cent.

2. In *multiparæ*.—Here the cervical catarrh is usually associated with other conditions—retroflexion, subinvolution, and especially, marked laceration of the cervix. The first treatment indicated is to diminish the passive congestion of the cervix by hot-water injections with astringents or antiseptics, and the use of the glycerine plug. The latter is prepared as already described (p. 17). If the uterus be retroflexed, it should be replaced and kept in position by a pessary. In cases where there is a distinct laceration of the cervix, and specially where the catarrhal patches can be made to disappear by rolling the lips inward on each other, Emmet's operation is indicated.

When there are hard shot-like retention cysts (Nabothian follicles) producing irritation by the pressure of their contents, the puncture of these with a lancet-shaped bistoury diminishes the chronic inflammation.

In very chronic cases, the only remedy is the removal of the diseased glandular tissue. To do this the curette may be used, but a better method is excision with the knife. And as the deeper tissues are involved, amputation of the cervix is the most satisfactory operation. —See ' Gynecological Operations '.

ENDOMETRITIS: GLANDULAR HYPERTROPHY.

Acute.—The treatment of acute endometritis is concerned in the first place with the removal of the cause. For the details of treatment in the puerperal variety the student is referred to a text-book of Midwifery. Post-operative gynecological cases are best treated by intra-uterine douching, the application of pure carbolic or of iodine, and by the injection of an autogenous vaccine.

Chronic.—Under the heading of chronic endometritis have been embraced several conditions whose pathology has only recently been understood. Most of them are cases of glandular hypertrophy, though in fibrosis uteri the endometrial changes are those of a chronic interstitial endometritis. When the condition is associated with subinvolution, the underlying cause of this must be dealt with, e.g., retained products of conception must be removed, or displacements corrected. Where there is present some derangement of the general health, such as neurasthenia or anæmia or digestive disorders, these must receive appropriate treatment. In these cases the general treatment is of equal importance to the local. When there is menorrhagia, this is treated as already described (p. 10).

Applications to the endometrium are made on a sound dressed with wadding (fig. 27). To dress a sound, lay a film of cotton wadding on the palm of the hand, moisten the end of the sound and lay it on the film, gather this round the sound by closing the hand, and turn the sound round within the closed hand till the wadding adheres to it. The dressing must bite the sound firmly so that it may not come off within the uterine cavity, and must not be so thick as to prevent its being carried easily in. To remove the cotton wadding afterwards, the dressing is unrolled under water. Of the various applications in use we recommend pure carbolic acid or iodised phenol—a saturated solution of carbolic acid in tincture of iodine. Formalin and picric acid have also been recommended. For applications to the endometrium anæsthesia is necessary ; it is a minor operation to be done with strict asepsis, and is usually combined with curettage.

The technique of **Curettage** will be given under ' Gynecological Operations'. Here we consider the indications. Its value in *diagnosis* is

FIG. 27.—SOUND DRESSED WITH COTTON WADDING FOR APPLICATIONS TO ENDOMETRIUM.

obvious and unquestioned. By the loop curette a continuous strip can be taken of the mucosa, its microscopic character sampled, and the following simple conditions diagnosed : recent abortion (chorionic villi), glandular hyperplasia, interstitial endometritis. For diagnosis of these glandular conditions, curettage should be performed during the resting stage (see p. 12), *i.e.* between two periods, as the normal changes associated with the period are readily mistaken for pathological conditions. Its greatest value in diagnosis is, however, the recognition of malignant disease—cancer, chorionepithelioma and sarcoma. As a means of *treatment*, especially of hæmorrhage, its value has been questioned of late. Since it has been recognised that the cause of menorrhagia is more frequently to be found outside the uterus than in the condition of its mucosa, curettage is performed less frequently.

The best results are obtained after recent abortion, in cases of fungous endometritis or mucous polypi, and in some cases of profuse hæmorrhage at the onset of menstruation. On the other hand, in chronic metritis after forty years of age, or in any case when the curette is felt to come at

once on firm tissue, no benefit follows. In fact the *benefit* of *curettage* is *proportional to the amount of tissue brought away*. In uterine fibroids, when the increase in size of the uterine cavity and the changes in the mucosa are an undoubted cause of the characteristic menorrhagia, we should expect to find scope for curettage; but unfortunately the firm character of the uterus and the distortion of its cavity by the tumour makes the operation difficult and of little value.

Senile Endometritis.—After the menopause, a process of atrophy begins in the genital tract. In the mucosa of the uterus there is a fibrous thickening of the vessels and diminished blood-supply, causing atrophy and disappearance of the glands, desquamation of the epithelium with adhesion of opposed raw surfaces, and gradual obliteration of the canal. In the vagina there is epithelial desquamation with adhesion of the opposed raw surfaces, and cicatrisation of the subjacent cellular tissue, causing puckering of the vaginal vault and sometimes constriction of the lumen. Further, the secretion loses its germicidal properties. Hence infection may occur, and the normal changes pass into pathological—senile vaginitis and endometritis. Senile endometritis is the more important, and for these two reasons: it simulates cancer of the uterus, and may lead to accumulation of pus in the uterus—pyometra, a very rare condition. The occurrence of a bloodstained, sometimes fœtid, discharge after the menopause suggests cancer, and calls for thorough examination by dilating the cervix, and curettage with microscopic examination. In senile endometritis very little tissue comes away, and, even without the microscope, it is seen to be a simple condition.

The treatment consists in applying pure carbolic after the curettage, followed by antiseptic douching for some time. It may be necessary to repeat the application of carbolic or iodised phenol in intractable cases; very rarely is hysterectomy called for.

CHRONIC METRITIS.

Under this heading we include the common condition of subinvolution and the rare one of fibrosis uteri. In neither case is there inflammation as the term 'metritis' suggests. By subinvolution we understand the large heavy uterus left after labour as the result of imperfect involution. Goodall has shown that in the puerperium the blood-vessels during normal involution are renewed by the development of new vessels within the area of an old one, the elastic laminae being pushed aside and absorbed. Fletcher Shaw, by the study of uteri removal by hysterectomy, showed that non-absorption of this old elastic tissue is the real cause of the enlarged uterus which used to be described as due to a 'chronic metritis'.

Subinvolution may arise at any age, and while there is occasionally

menorrhagia, it is not till later in life that it becomes a serious symptom. In multiparous patients after forty years of age, towards the menopause, an enlarged firm uterus is occasionally found with hæmorrhage as the characteristic symptom ; so severe and uncontrollable by curetting or styptics, that hysterectomy is the only treatment. These cases were first described as arterio-sclerosis from the changes found round the blood-vessels. Then the term 'fibrosis uteri' came in, which implies that the changes are not limited to the area round the vessels, that the mucous membrane as well as the muscular wall is involved, and that the increase is in the fibrous tissue.

There is difference of opinion as to the frequency of the two conditions ; and also as to terminology, according as the subject is looked at from the clinical or pathological standpoint. Eden and Lockyer, in their admirable 'Text-book on Gynecology', speak of 'Chronic Metritis and Allied Conditions', and say: 'Under this term are included for convenience three different pathological conditions, all of which are closely allied in their clinical features although divergent in etiology and structure, only one being a true inflammatory process'; and again : 'These conditions are met with mainly, but not exclusively, among parous women. Two series of cases (totalling seventy-four) have been recorded by Fletcher Shaw, and one series of ninety-one by Briggs and Hendy, and in both these series approximately the same proportion of cases is found in which pregnancy occurred, namely, 85 to 86 per cent. The importance of *pregnancy* as a causal factor is clearly indicated by these figures.' As to the relative frequency of the three conditions grouped under the term 'chronic metritis', Fletcher Shaw noted that in 95 per cent. of cases in which hysterectomy was performed for *chronic metritis* the histological condition was *subinvolution ;* in 4 per cent. it was *hypertrophy ;* and in 1 per cent. it was true *chronic metritis,* i.e. a late result of acute interstitial inflammation. It must be recollected that these three groups may overlap, *e.g.* a subinvoluted uterus may be also the seat of a chronic inflammation.

Treatment.—The treatment of subinvolution immediately after delivery is directed to the proper management of the puerperium, the removal of what will interfere with involution as in the curetting of the uterus after abortion, seeing that the patient does not rise too soon, and that she nurse her baby at any rate for the first few months. Where the latter is not possible, ergotin given for some weeks promotes involution. If a case is seen at a later stage, the following is the line of treatment, though the size of the uterus cannot actually be reduced. The first object should be to improve the pelvic circulation. In the case of those who have to work for their living, sedentary occupations or those that entail standing for a long time in one position are obviously prejudicial. In the case of well to-do patients, the relief of the pelvic discomfort by rest

makes the 'unemployed' take to her couch and become a chronic invalid. Hence the importance of exercise and fresh air. A certain amount of exercise in the open air should be as emphatically prescribed as a certain amount of rest.

The pelvic circulation is stimulated by vaginal injections; hot water will generally be found to be the most valuable; cold water is a more effectual stimulus, but few patients can stand it. The vaginal douche should be used just before going to bed. Occasional warm baths are useful in some cases; when the patient is in the bath the vaginal douche can be used at the same time with greater freedom and effect. A cold hip-bath every morning is the best stimulus to the circulation. Medicinal baths have a beneficial effect in chronic metritis; and for patients who can afford it, spa treatment still has its place.

Further, the drinking of medicinal waters is beneficial. For chlorosis, the advantage of waters which are rich in salts of iron is evident. Comparatively few patients may be able to enjoy the luxury of a course of treatment at a spa; but much benefit will be derived from change of air to the seaside, or to the regular régime and cheerful surroundings of a hydropathic.

Attention to the action of the bowels is all-important. Accumulations in the rectum and sigmoid flexure of the colon favour pelvic congestion, and interfere with the appetite and digestion. Attention to diet is important, and liquid paraffin is better than the prolonged use of aperients. Of these the mineral waters—Friedrichshall, Carlsbad and Hunyadi Janos—are the best. Carlsbad salts are specially useful in bilious patients; a teaspoonful should be dissolved in a tumblerful of water and drunk in repeated sips before breakfast. Friedrichshall and Hunyadi Janos waters act best mixed with an equal amount of hot water; their dose varies from a wineglassful to a tumblerful.

Where there is menorrhagia, we may prescribe ergotin in pill or tabloid, or the liquid extract combined with liq. strychnin. hyd.; also calcium lactate or pituitary extract—see pp. 6 and 10. Preparations of iron are required between the periods to counteract the loss of blood.

Towards the menopause, hæmorrhage may become so serious as to call for *hysterectomy*. The first case we saw of the condition now described as fibrosis was sent into the ward as one of cancer. Examination showed a healthy cervix and enlarged uterus. The patient was profoundly anæmic; and as the hæmorrhage was considerable and she could not stand anæsthesia twice, it was decided to do hysterectomy at once without preliminary curettage. On laying open the uterus there was no gross lesion, but the vessels stood out suggesting arterio-sclerosis. The pathologist's report confirmed this, and under this heading the case was recorded.

Peritonitis, with inflammation of the uterine appendages, or cellulitis,

are also present with these changes in the genital tract, summed up under
'pelvic inflammation'. Their treatment will be referred to later, but they
also underlie Bennett's clever delineation of the clinical picture with which
we prefaced the treatment of pelvic inflammation. In it he emphasised
the effect of chronic inflammation on the nervous system, which shows
itself in the invalidism of the woman of leisure and the work-handicap of
life becoming a burden instead of a joy in the case of the woman of the
middle class and the working class. The effect on the nervous system
shows itself in two forms. There is the nervous woman who has 'to take
herself in hand', 'to pull herself together'; and the one whose nervous
energy is too much exhausted to do this, who needs rest. The diagnosis
of these types is difficult and calls for careful study of the personality. A
display of unusual energy may camouflage overstrain near the breaking-
point: it is possible to be too tired to lie down.

Some cases of nerve tire recall the boy's mechanical toy—a model of
a fixed engine with fly-wheel, piston, boiler and spirit lamp. When the
spirit lamp burned low, the wheel made a few turns, then steam blew off
at the dead point till enough accumulated to turn it again. Lack of
pressure produced spasmodic efforts in place of steady work. The treat-
ment was to trim the lamp, and prevent escape of steam till steady going
was possible. To obtain the latter result in the human engine, rest is
required—rest of mind as well as body. The patient should be taught
to relax—not merely to lie down, but to lay each limb down, and to make
the mind a vacuum. She should sleep with the window open, practise
deep breathing, slow steady full inspiration, followed by equally steady
complete expiration: a good remedy for sleeplessness. Drink a tumbler
of hot water before going to bed, and the first thing in the morning. In
the morning pour a jug of hot water, then of cold, down the spine, followed
by rubbing with a hard bath towel. And do Swedish exercises, especially
those directed to the musculature of the back and abdominal wall, as
regularly as she does her hair. Some cases call for six weeks' treatment,
and by a trained masseuse, in a nursing home. But many cannot afford
the expense. And the advantage of introducing such a régime as the
above into the home life is that it is continued over a long period; and
once the patient begins to feel the benefit of it, she will continue it
indefinitely. She should report herself from month to month, and under-
stand that nerve tire disappears as slowly as it comes.

FIBROID TUMOURS OF THE UTERUS.

Fibroid tumours are the most common uterine tumour, the most
frequent solid tumour in women rising out of the pelvis into the abdomen.
Beginning as a fibrous knot in the uterine wall, they may grow towards

its peritoneal aspect, remain in the wall, or grow towards the uterine cavity. In the latter position they produce the most marked symptoms, and also give rise to the fibrous polypus. While the tumour itself consists of firm fibrous tissue and is non vascular, it lies in a bed of loose areolar tissue by which it is nourished and from which it can be shelled out—a fact of importance for its operative treatment. This also explains how a tumour may be extruded from the wall of the uterus into its cavity (carrying the mucosa before it), and finally into the vagina as a fibrous polypus. Their most characteristic and serious effect is on the menstrual function, causing menorrhagia and consequent anæmia—the usual indication for their removal : less important but also characteristic is their effect on the reproductive system—sterility. Their development is painless, pain means impaction of the tumour or degenerative changes in it ; and their development is rarely accompanied by peritonitis—a common complication of ovarian tumour. A fibroid may develop a new train of symptoms when it undergoes degeneration, of which the most important is necro-biosis—red degeneration.

The student will be puzzled by the difference of opinion as to their frequency and seriousness. Post-mortem room data finds a fibroid in 20 per cent. of women over thirty-five years of age and 50 per cent. over fifty years. But these include small fibroids, without symptoms during life. The clinical observer, who deals only with cases where symptoms lead the patient to seek advice, makes their frequency much less. There is also difference of opinion as to their seriousness. The operating gynecologist sees a much larger proportion of serious cases than the ordinary practitioner, and his opinion is in favour of operation ; the practitioner, dealing with slighter cases of hæmorrhage, makes the mistake of continuing palliative treatment too long, until the patient, through anæmia, is in a less favourable condition for operation.

Related in their development to the period of sexual vigour, they do not necessarily become innocuous towards the menopause, as was formerly supposed. Our ward records of hysterectomy for fibroids show that some 46 per cent. of the patients were between forty and fifty, and 18 per cent. over fifty years of age.

Their treatment is best considered under the heads of the treatment of symptoms and the removal of the tumour. It must be borne in mind, especially since the operative treatment of fibroid tumours has come into such prominence, that a considerable proportion of fibro-myomata are symptomless and do not call for treatment. Further, when symptoms are present, of which the most important is hæmorrhage, palliative treatment will often give relief. Under palliative treatment we include the use of ergot and other drugs to control hæmorrhage, electricity and X-rays.

The most frequent symptom of a uterine fibroid is menorrhagia, and this can be often controlled by the administration of medicines, of which

the most valuable is ergot. Its beneficial results in the treatment of uterine fibroids were first brought forward by Hildebrandt and A. R. Simpson. In addition to controlling the menorrhagia it checks the nutrition of the tumour by diminishing its blood-supply, and if it be sub-mucous favours its pedunculation and expulsion. Ergotin is more active than the liquid extract, and may be given in pill, suppository (4 grs. in each), or in serious hæmorrhage hypodermically.

The further treatment of menorrhagia has already been considered (see p. 10).

The symptoms due to the weight of the tumour may be relieved by artificial support. Thus patients with a small fibroid often derive benefit from wearing a Hodge pessary ; the discomfort of a large abdominal tumour is lessened by wearing a broad flannel bandage.

When the tumour nearly fills the pelvis and is beginning to press injuriously upon the bladder and rectum, we may be able to push it up out of the pelvis into the abdomen. The most favourable case for this manipulation is a sub-serous fibroid with a distinct pedicle.

Treatment by electricity, with which the name of Apostoli is associated, was popular for some years before hysterectomy was made the easy and safe operation it is to-day. Now it is only used in the few cases in which a patient refuses abdominal section. It restrains hæmorrhage and may check the growth of the tumour, but it is only palliative. The same may be said of electrical treatment by X-rays, which has been brought forward recently as a means of checking hæmorrhage (see p. 10).

Indications for Operation.—As to what cases should be operated on, there is difficulty in laying down definite rules. Each case must be judged on its own merits, for we are here dealing with a tumour of a different category from an ovarian tumour or cancer, where the mere fact of the presence of the neoplasm calls for its removal. A case of uterine fibroid is often under observation for some time before the necessity of operation becomes evident. We may say that operation is called for most frequently when *persistent uterine hæmorrhage* is affecting the patient's strength, and has resisted other forms of treatment. Rarer indications are large tumours which cause discomfort or pressure symptoms, or interfere with the patient's occupation ; small tumours which, through impaction in the pelvis, are causing pressure symptoms ; rapidly growing tumours, which on this account are likely soon to be troublesome, though there are no urgent symptoms at present, and where pain or attacks of inflammation with pyrexia point to degenerative changes in the tumour.

Of the various degenerations, necro-biosis or red degeneration calls for special remark as a reason for immediate operation. Probably the commonest form of degeneration, it occurs in pregnancy or the puerperium, and about the menopause. Its being due to thrombosis, with retardation of the circulation in the tumour, may explain its occurrence
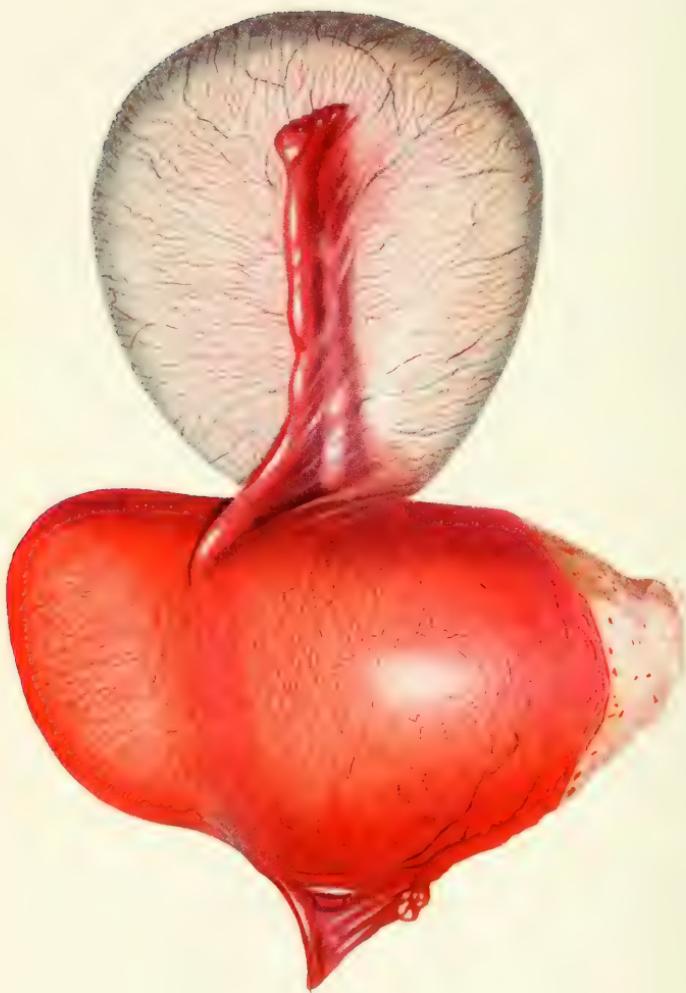
PLATE II.

Pregnant uterus with fibroid tumour which showed necro-biosis, also an ovarian cyst.

in pregnancy. The preparation shown in Plate II. was obtained from a patient admitted to hospital in whom acute symptoms had developed in the third month of pregnancy. The uterus was so tender that it could not be defined, but was evidently larger than at the third month. On abdominal section this was seen to be due to a fibroid situated at the fundus. The pregnant uterus was removed along with a small ovarian tumour. On cutting into the fibroid subsequently, it was seen to be undergoing red degeneration. This preparation forms an interesting contrast with that shown in Plate I., also from a case of operation for acute symptoms in pregnancy. In that case the ovaries were removed for ovarian tumour and the pregnant uterus left.

While the surgical treatment of fibroid tumours includes the removal of pedunculated sub-mucous tumours as polypi, and the enucleation of small interstitial ones, the chief interest gathers round the treatment of those larger interstitial tumours, the removal of which implies the amputation of a portion of the uterus. The development of the operative technique for this is one of the most interesting subjects in operative gynecology.

The operative treatment of fibroids followed step by step that of ovarian tumours, which here led the way. The abdomen was first opened for a fibroid, by mistake for an ovarian, by Lizars in 1825; but at that time the extirpation of these tumours was not thought of. Success, however, in the removal of ovarian tumours encouraged the operator to proceed with fibroids, and in 1837 Granville successfully removed a pedunculated sub-serous tumour. The first deliberate hysterectomy for an interstitial fibroid was done by Kimbal in 1855, but it was Koeberlé and Péan who, by their operative methods and success, secured for the operation a recognised place.

As in ovariotomy, the pedicle was first treated extra-peritoneally, because the size of the uterine stump and the difficulty of controlling hæmorrhage from it made operators hesitate to drop the pedicle into the abdomen. It was kept outside the abdominal wound in a clamp. As this required to be tightened from time to time, the use of an elastic ligature and then of the serre-nœud (a small wire ecraseur which could be tightened up as the pedicle sloughed off) marked the next stages in advance. To shut off this sloughing mass from the peritoneal cavity was the great difficulty—in saving the patient from the risk of hæmorrhage she was exposed to the danger of sepsis; and if both these difficulties were overcome, a wound was left which took weeks to close.

The great advance of recent years, which has made the operation of hysterectomy for fibroids as safe for the patient as ovariotomy, has been the ligation of the uterine arteries separately, and the formation of peritoneal flaps, so as to shut off raw surfaces and ligatures from the peritoneal cavity. On looking into the pelvis after hysterectomy is com-

pleted, nothing is seen except the line of apposed peritoneal surfaces running across the pelvic floor ; the stump and all raw surfaces are retro-peritoneal (see Plate IV., fig. 4).

Fibroid tumours may be removed by the abdominal or the vaginal route. Owing to the size of the tumours and the improved technique in abdominal section, the vaginal route is not much used in this country, except in the removal of polypi, or a small cervical fibroid, so that under operation for fibroids (see pp. 98–101) we shall only describe their removal by abdominal section : myomectomy, in which the tumour alone is re-moved ; hysterectomy, where the uterus is removed with the tumour, am-putation being usually made through the isthmus ; and pan-hysterectomy, in which the whole uterus, body and cervix, is excised. Whether the ovaries should be removed with the uterus depends on their condition. Frequently they are cystic ; but it is desirable to leave as much ovarian tissue as possible on account of its internal secretion (see p. 5).

The rare *cervical fibroid*, when small and projecting into the vagina, may be removed *per vaginam* by incising the capsule of the tumour and enucleating it from its bed. Usually, however, their position and size call for removal by abdominal section. The uterus is removed with the tumour as in the operation for supra-vaginal hysterectomy, the tumour being shelled out of its bed in the cervix, and the rugged cervical stump trimmed before suturing it.

UTERINE POLYPI.

In speaking of fibroid tumours we noted the tendency of sub-mucous fibroids to become pedunculated. Pedunculated tumours are known as polypi, and it is convenient to look at uterine polypi by themselves. This term includes two types of tumours which are anatomically distinct.

    1. A sub-mucous fibroid which has become pedunculated and extruded from the uterus (fig. 28).

    2. Mucous polypi (fig. 29).

They may be thus contrasted :

A fibrous polypus grows usually from the body of the uterus ; a mucous polypus most frequently from the cervix. A fibrous polypus springs from the muscular wall ; a mucous polypus from the mucous membrane. A fibrous polypus is the larger tumour, from the size of a goose's egg upwards—it must have been of a sufficient size for the uterus to contract on it and expel it ; a mucous polypus is of small size, from a pigeon's egg downwards—rarely is it larger than a cherry, though sometimes of elongated shape. A fibrous polypus is of firm consistence unless it has become œdematous ; a mucous polypus is soft. A fibrous polypus is pale, sometimes congested and of a dark purplish colour ; a mucous polypus is of a bright cherry red. A fibrous polypus

is non-vascular though the mucosa over it may be congested ; a mucous polypus is a very vascular tumour.

Should the neck of a fibrous polypus be constricted by the cervix and the part in the vagina infected, the polypus sloughs. A sloughing polypus is liable to be mistaken for cancer of the cervix, a mistake which may cost a life. We recall a case sent into hospital as one of cancer. The patient was acutely septic and died of septicæmia after removal of the polypus. Had a correct diagnosis been made at an earlier period, by passing the finger through the os and recognising that it was a pedunculated sloughing tumour, the case would have been sent in at once and operated on in time.

FIG. 28.—FIBROUS POLYPUS—A SUB-MUCOUS FIBROID WHICH HAS COME TO LIE WHOLLY IN THE VAGINA.

Treatment.—When growing from the cervix, their usual situation, mucous polypi are easily removed by torsion. When in the body of the uterus, they can be removed by the curette. In the case of the fibrous polypus, the neck of the polypus is produced artificially by the traction on the uterine mucosa with fibrous tissue within it, produced by the expulsion of the tumour ; and shows all degrees of thickness. In dealing with a tumour where one cannot make out the thickness of the pedicle, try in the first instance to remove it by torsion ; if it will not yield to torsion it may be divided with the scissors. A pair of curved, probe-pointed scissors is best. After the pedicle is cut through there is little tendency to bleeding, but it is safer to pack with gauze and give ergotin.

Should the tumour have a broad base of attachment, without a distinct pedicle, it is dangerous to attempt removal by scissors.   The right course is to remove it by hysterotomy or hysterectomy—vaginal or abdominal.

Should the polypus be still within the body of the uterus, the cervix must be first dilated before the tumour can be diagnosed or treated.   The uterine cavity is enlarged in all cases of polypi, and in the case of a tumour growing from the fundus the possibility of its having caused inversion of the uterus must be borne in mind.   When it is suspected
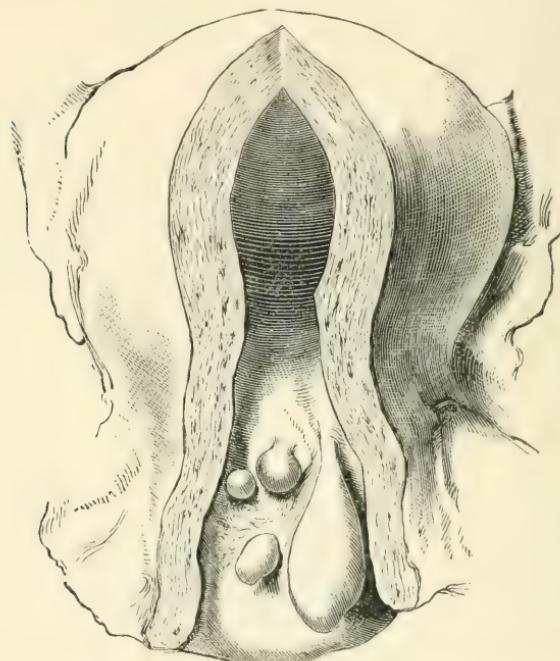
FIG. 29.—MUCOUS POLYPI SPRINGING FROM THE CERVIX.

from the bimanual examination, care is required in cutting through the pedicle, not to injure the uterine wall.

CANCER OF THE UTERUS.

Cancer, in the large proportion of cases (nine-tenths), develops in the cervix, the place where labour leaves its mark.   When speaking of a case of cancer of the uterus it is usually cancer arising in that situation that is meant ; in the other, it is spoken of as 'cancer of the body '.   From its comparative rarity, and similarity in diagnosis and treatment, the

latter is better considered along with the other malignant diseases of the body of the uterus.

In passing from fibroids to cancer, from the simple to the malignant common form of uterine tumour, the student who thinks is made aware of a sharp contrast—a contrast not in the principles of treatment only, but in the origin, history and clinical picture which lead up to treatment. Fibroids are the tumour of the well-to-do, cancer of those exposed to privation, the former being more frequent in private, the latter in dispensary practice. Fibroids in their appearance and development are related to the period of sexual vigour, showing themselves earlier in life and tending to cause less trouble towards the menopause. Cancer is not so related, showing itself later in life, usually after forty, and sometimes after the menopause. Fibroids are the tumour of the sterile, cancer of the fertile : the causal link running in the opposite direction, the fibroid favouring sterility and fertility, predisposing to cancer. Fibroids are slow in growth, extending over many years ; cancer is rapid, running its course in two or three years. Our experience is that when a patient with cancer seeks advice, on going into her case it will be found that symptoms of its presence may be traced back for a year, and the subsequent duration of life, without operation, is only one or two years. Fibroids are common in the body of the uterus, rare in the cervix ; cancer is rare in the body and common in the cervix. Fibroids develop in the connective tissue, cancer in the epithelium. A contrast, therefore, comes out in the circumstances of the patient, her age, child-bearing ; and in the rate of growth, situation and type of the tumour.

A contrast comes out also in treatment. As in fibroid tumours, treatment is palliative and operative, but operation falls to be considered first and for this reason. In dealing with a fibroid the treatment of the symptoms comes first in practice. The hæmorrhage, which is as a rule the cause of danger rather than the tumour itself, can be treated by drugs ; whether the bleeding uterus should be removed, is a later consideration. Fibroids are only occasionally a danger to life. A cancerous uterus must be removed as soon as the disease is recognised, and the sooner the better. Palliative treatment, the treatment of symptoms, has its place only in the later stages of the disease, in inoperable cases.

No subject in Gynecology demands more careful study on the part of the student than the early recognition of cancer. Neglect of this will, when he goes into practice, mean the sacrifice of life. If he is content to be able to diagnose cancer only when the tyro can spot it, the chance of early and successful operation is lost.

Cancer is more common in women than men, and its occurrence is related to the function of child-bearing. Its most frequent situation is the uterus, next the breast. A comparison of these two brings out points in diagnosis and treatment. Removal of the breast has given

better results than removal of the uterus, because of earlier recognition and easier removal. Cancer of the breast is a matter of direct observation. Cancer of the uterus is at first a matter of inference from symptoms. Removal of the breast and axillary glands is a simple affair compared with excision of the uterus and the infiltrated cellular tissue and glands. The surgeon cannot clear out diseased tissue from the pelvis as he can from the axilla. Still, important advance in the surgical treatment of cancer of the uterus has been made of recent years, and is one of the notable triumphs of gynecological surgery.

And here the practitioner can aid the expert operator by diffusing ideas in the mind of the laity with regard to the treatment and curability of cancer, which will lead patients to seek advice at an early period. An important part of his work is educative.

The first symptom of cancer is *hæmorrhage*. The appearance of blood, which from any other part of the body causes alarm and leads her to seek advice, is discounted in the case of the uterus. She has got accustomed to the sight of blood from that organ, so accustomed that nothing seems more natural and is therefore less likely to arouse suspicion than uterine hæmorrhage. After the menopause she is more likely to seek advice at once, but even then she may regard it as a return of the monthly period. The presence of her worst enemy is camouflaged by a natural occurrence. Further, the hæmorrhage of early cancer is slight, the watery discharge is only occasionally streaked with blood due to rupture of small vessels in the vascular growth. It may come on after the use of the douche, or on coitus.

As to *pain*, this is associated in the lay mind with cancer. Cancer is known to be the most painful form of death. But if a patient waits for pain to ring the alarm bell, she finds the opportunity for successful operation has passed. Cancer of the uterus in its early stage is *painless*.

The wasting often seen in connection with malignant disease is not so common in cancer of the uterus. Unfortunately for the operator, patients do not often become emaciated. A fat abdominal wall not infrequently causes difficulty in abdominal hysterectomy.

Besides correcting erroneous ideas, the practitioner has to impress on the laity that as the only treatment with a hope of cure at present is operation—we shall speak of radium later on—the right course is not to wait till marked symptoms develop, but to seek advice in any irregularity of menstruation towards the menopause. She should regard cancer as curable by operation when taken early enough. And just as the child is taken to the dentist to have its teeth looked over, she should consult her doctor and let herself be examined just to be sure that everything is right. To wait for pain in the one case may mean the loss of a tooth, in the other the sacrifice of life. An examination a month after confinement will materially reduce the chronic diseases of women; examination

towards the menopause, as a routine, will reduce the mortality from cancer. These ideas must be spread. Patients will never learn unless they are taught. The term 'doctor' originally meant one who could teach.

As chairman of a committee appointed by the British Medical Association to spread information among nurses and midwives as to the first symptoms and signs of cancer, Dr. M'Cann, of the Samaritan Free Hospital for Women, rendered a great service along the lines of educating the lay mind. The practitioner will find in his book on 'Cancer of the Womb : its Symptoms, Diagnosis, Prognosis and Treatment' (Hodder & Stoughton, London), much valuable information.

Besides the early symptom of hæmorrhage, and the late one of pain, there is foetid discharge due to infection of the breaking-down neoplasm, which has a characteristic odour. It means that the condition is advanced, often too advanced for a clean operation. If, however, the neoplasm is growing into the vagina as a cauliflower excrescence rather than extending into the cellular tissue, there may be less breaking down. It should also be noted that the extension may be upwards into the cervical canal, not showing on the vaginal aspect of the cervix. Such cases are liable to be missed on vaginal examination owing to the smooth character of the mucosa round the os, though the enlargement of the cervix should lead to examination of the canal with the sound, or the finger after dilatation. Diagnosis of early cancer has to be made by the microscope, and any fragments of tissue removed by the curette should be put in 5 per cent. formalin and sent to a laboratory for report. If the curette is used for the diagnosis of cancer, it should be used lightly, the object being to remove just enough tissue for diagnosis ; to create raw surfaces and implantation infection, is undesirable if hysterectomy is likely to follow. In operative treatment a thorough curettage is sometimes done and the cervix sutured, as a preliminary to hysterectomy.

The operation of hysterectomy is necessarily more extensive in cancer than fibroids. It is always a pan-hysterectomy (removal of the whole uterus), and the ovaries are removed with the uterus. Removal of the cellular tissue of the broad ligaments with glands, and of the upper third of the vagina, has been associated with the name of Wertheim of Vienna, but every operator has his own technique.

With regard to operation, one is often asked what is the risk, and what are the prospects of recurrence. No definite statement can be made, as it depends on the extent to which the disease has advanced, and on the skill and experience of the operator. The mortality may be anything from 5 per cent. to 40 per cent. The latter figure was that of Wertheim's operation when it was first performed ; some experts have reduced it to 10 per cent. As to non-recurrence, available statistics show that about 20 per cent. are well five years after operation (M'Cann).

Palliative Treatment.—In inoperable cases treatment is directed to symptoms. These are hæmorrhage, fœtid discharge, pain and resulting cachexia. While hæmorrhage, slight in amount, is an early symptom, it is rarely a cause of death. When one thinks of the vessels in the area of a spreading carcinoma, serious hæmorrhage is not so frequent as one would expect. Drugs have no effect on diseased vessels. Hot douches or plugging is the only treatment for a sudden and serious hæmorrhage. Two points with regard to it. The packing must not be firmly done in the upper part of the vagina ; it should be firm at the outlet and fixed with a T-bandage. Styptics must be used with caution ; we have seen a patient die from peritonitis set up by perchloride of iron passing into the peritoneal cavity from a plug, soaked in it, pressed in with too great vigour. The upper part of the strip of gauze may be saturated with adrenalin. The packing has to be left in for some time, say for forty-eight hours, otherwise the hæmorrhage starts again on its removal.

For *fœtid discharge* give douches of weak perchloride of mercury, formalin (1 in 2000), eusol or lysol. After the douche, the vulva should be dried and vaseline applied freely. Diapers should be frequently changed, also the draw-sheet. The odour in the room makes it almost uninhabitable unless these points are attended to.

As it is the breaking-down of the neoplasm with the discharge and the risk of hæmorrhage, rather than its extension (excepting the involvement of the ureter with consequent uræmia), that undermines health, great benefit is derived from scraping away the newly formed carcinomatous tissue as far as it is recognisable. It is surprising to see the improvement in the general condition that may result from scraping away as much as possible of the diseased tissue with a sharp spoon or curette, especially if it is followed by the application of chloride of zinc on gauze. Below the chloride, packing soaked in an alkali is required. Or the cautery may be used instead of the spoon and chloride. After the slough has separated, the tissue contracts. For some months after this treatment, the general condition may improve so markedly that the patient thinks a cure has been effected.

Pain is only relieved by opium. Owing to its effect in disturbing digestion and causing constipation, its use should be deferred as long as possible. Aspirin and the other coal-tar derivatives should be tried in the first instance. When opium is begun it may be given in opium pills, or better as morphia suppositories, which disturb digestion less, followed by a hypodermic at night to secure sleep. Once begun, the patient becomes an opium-eater. The dose may be increased until 2 grains of morphia are taken daily.

The probable *duration of life* is an important question for the patient's relatives, especially her family. It is better not to let the patient herself know the nature of her malady, but on the other hand to conceal nothing

from her friends. And this for two reasons. It is better for her not to know that she is suffering from cancer so long as the fact can be concealed from her, because she knows that this is the most painful form of death, and there is no reason why she should suffer by anticipation. Experience shows that patients find out soon enough for themselves what is wrong. And the other consideration is this, that there is not the same reason for letting the patient know as there would be in a case of illness that might terminate rapidly. In fact, we are dealing with a condition in which sudden death is extremely rare.

Radium Treatment in Gynecology.—In every case of malignant disease the first choice is operation. Should the patient refuse operation, or the case be unsuited for operation either because of the advanced stage of the disease or of the general condition of the patient, radium should be employed. An inoperable case may be rendered operable or, short of that, the pain, discharge and hæmorrhage considerably relieved.

The best results are obtained by a combination of surgery and radium or X-rays, the radium possibly being employed as a preliminary to render the case more suitable for operation, and operation being followed by radium or X-rays, so that portions of the growth left behind or disseminated may be attacked.

There are two drawbacks to radium and X-rays which may be mentioned :

1. They do not appear to exercise any influence over metastatic growths. Nor when the local lesion has been cured but the neighbouring tissues have been invaded, does radium seem to check further extension.

2. The sphere of action of radium is very limited, not extending probably more than 4 c.c. from the centre of the tube ; and although the cells in the immediate neighbourhood receive a lethal dose, those at a distance may receive a stimulating dose, as a result of which their growth is more rapid and vigorous. Where, therefore, the growth is other than early and local, it is best to combine X-rays with radium, applying the former in areas away from the local growth and following up the line of lymphatic distribution.

According to Knox the most useful field for radiation therapeutics is that of prophylaxis. All cases of malignant disease after operation should be submitted to a thorough and systematic course of X-ray treatment supplemented if necessary by radium. This treatment should be applied once a month for six months, and the patient kept under observation for another year so that a recurrence may be treated without loss of time.

MALIGNANT CONDITIONS OF THE BODY OF THE UTERUS: CANCER ; CHORIONEPITHELIOMA ; SARCOMA.

We group these together because their treatment is the same— removal of the uterus by pan-hysterectomy. It should be noted that all

of these conditions are diagnosed in the same way—by dilatation of the cervix and removal of a portion of tissue by the curette for microscopic examination. The history of chorionepithelioma differs from the other two in that its development is preceded by pregnancy, especially by pregnancy which has been terminated by a hydatid mole. So important is this that after an abortion showing this condition, the practitioner should keep his eye on the case for some months. After normal pregnancy it shows itself in the puerperium by a return of hæmorrhage with fœtid discharge. Hence the importance of always examining material removed by the curette for hæmorrhage in the puerperium. Early hysterectomy is of even greater importance in chorionepithelioma from the unusually rapid course of the malignant neoplasm, and the development of metastases.

Under affections of the Fallopian tube, we have to consider the treatment of salpingitis, usually septic or gonorrhœal, rarely tuberculous; of consequent pyosalpinx; and of tubal gestation. Very acute cases of salpingitis, coming on after abortion or labour or gonorrhœal infection, usually end in pyosalpinx, the only treatment of which is operative. And the same is true of tuberculous salpingitis, which usually comes on without apparent cause, though sometimes there is a remote focus of infection, in the chest or glands.

In chronic cases of salpingitis, the ovary is also involved, and for these cases the term 'inflammation of the appendages' is a better clinical description.

SALPINGITIS : SALPINGO-OÖPHORITIS.

There is divergence of opinion as to the correct line of treatment of salpingitis in the acute stage. In the belief that resolution with restoration of function may follow, or that with the reduction of virulence in the infective process a subsequent abdominal operation if necessary may be less dangerous, conservative treatment is usually advised in the first instance.

Where, however, the diagnosis is not clear, and appendicitis cannot definitely be excluded, or where diffuse peritonitis is evidenced by the general rigidity of the abdominal wall, great rapidity of the pulse and constant vomiting, the indication for immediate interference is strong. If palliative treatment is decided on, the patient is propped up in Fowler's position, the bowels freely purged and the diet limited to fluids. For the pain, hot fomentations are applied to the lower abdomen, and aspirin given. Where local tenderness permits of it, hot vaginal douching twice or thrice daily and the insertion of ichthyol plugs are of value.

Inflammation of the Uterine Appendages.—Formerly stress was laid on inflammation of the ovary; on ovaritis or oöphoritis, if more

regard is paid to etymology than ease in pronunciation. Since abdominal section has shown that the tube was also involved, and pathological investigation that it is the etiological factor, the emphasis is now laid on salpingitis. Clinically the two are associated, and we prefer to speak of inflammation of the appendages (salpingo-oöphoritis), in which both tube and ovary are involved, often matted together by adhesions, and palpable as an undefined mass beside the uterus. That is the most frequent condition, and the usual one in the early stage. Later, as the result of chronic changes, tube or ovary may stand out, and we are justified in speaking of one or other as specially affected : according as the retort-shaped swelling of a pyosalpinx or the permanently enlarged cystic ovary can be recognised.

Treatment is palliative or operative.

The treatment of slighter cases is rest in bed for some weeks, with attention to diet, which should not be stimulating, and without alcohol ; the bowels kept open by saline aperients ; and vaginal douches, followed by glycerine and ichthyol tampons. Afterwards, care is required at the menstrual period.

Removal of the Uterine Appendages is much less frequently performed now, since the importance of the internal secretion of the ovary has been recognised. It is only the *dernier ressort* in cases of pelvic pain. In practice there is nothing more difficult than to decide whether to advise removal of the uterine appendages for pelvic pain. This is because of the personal equation. An amount of pelvic pain which will make one patient take to her bed will be borne by another and not allowed to interfere with work. And the mention of work suggests this consideration —that it is easier to judge of interference with occupation in the case of those who have to work for their living. A factory girl will not make so much of her suffering as a west-end girl who has nothing to do. The gynecologist finds his problems not among the unemployed of the east end, but of the west end.

Before operating on the uterine appendages, it is important to explain to the patient and to her husband the nature and effect of the operation, in case it should be found necessary to remove the appendages on both sides. The best way to put it is that it brings on the change of life prematurely, but in no way unsexes the patient. The removal of the ovaries does not seem to have the same effect on women as castration has on men. Sexual feeling is often not affected any more than it is after the menopause. And while making it perfectly clear that menstruation will cease, and the possibility of conception also, she may be assured that this is all. Changes may take place in the figure, the patient may take on fat ; but these are only the minor changes which occur after the menopause. A woman is no less a woman after the removal of the ovaries than she is after the change of life. It is absolutely necessary

5

to have the full permission of the husband as well as of the patient, so as to leave the operator free to do whatever he may find necessary at the time of operation.

Where both ovaries are removed, menstruation ceases as a rule, and the *menopause is induced.* Some cases continue to menstruate afterwards, of which the explanation is that a bit of ovarian tissue has been left, or there may have been a third ovary. In other cases there is irregular bleeding for a few months before the artificial menopause appears. Further, as after the normal menopause, there are general disturbances of the system, such as irregular flushings due to vasomotor changes, for which the mind of the patient must be prepared.

The cases which derive least benefit are those where the operation is
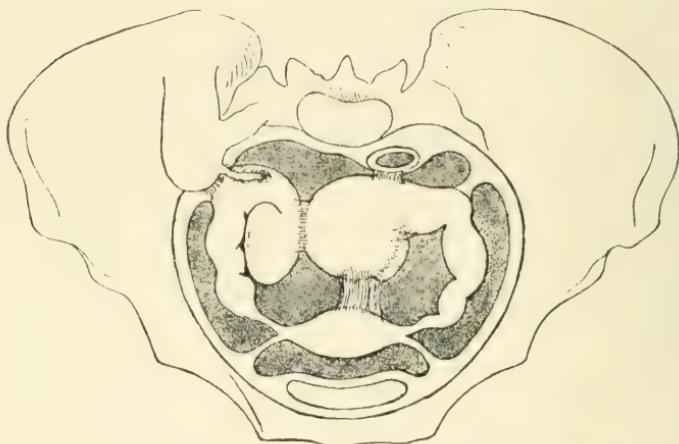
FIG. 30.—DOUBLE PYOSALPINX WITH ADHESIONS TO RECTUM, UTERUS AND VERMIFORM APPENDIX.

done simply to relieve pain, and one should always explain, especially to neurotic patients, that a cure cannot be promised, and leave it for her to say whether she wishes the operation performed. Some cases benefit for a month or two, and within a year after the operation are as bad as ever before.

In cases of **pyosalpinx** there is difference of opinion as to whether the operation should be performed at once or deferred till the acute stage is over and the pus has become sterile. We are in favour of waiting, as the operation becomes safer for the patient. In cases of a right-sided pyosalpinx it is often difficult to diagnose it from an acute appendicitis, and this may be a reason for immediate operation.

While there may be no simpler operation than the removal of the uterine appendages, on the other hand there may be no more difficult one.

Fig. 30 shows the right tube adherent to the appendix, and the left tube lying in the pouch of Douglas, with adhesions to the rectum and uterus.

Where the tube is bound down by adhesions and the normal relation of the abdominal structures destroyed, it is better to start removal at the uterine end of the tube, tie this off first, and then work outwards towards the side wall of the pelvis. In such cases the broad ligament may require to be ligatured in several parts, the operator beginning at one end, preferably that next the uterus, as already said, and working his way round and below the dilated tube, ligaturing and clipping, or putting on one forceps after another. A further difficulty is the risk of the tube rupturing during its removal, and its purulent contents escaping into the peritoneal cavity. To prevent this, swabs are packed round the structure to be removed, and care is taken in handling the tube to avoid its rupture.

EXTRA-UTERINE GESTATION.

In 'Gynecological Diagnosis and Pathology' extra-uterine gestation is described under the pathology of the tubes, as it is usually a tubal condition. Its operative treatment—and that is the only treatment—will be considered along with removal of the tubes for other conditions. This is the natural place, therefore, for considering the indications for operation, before going on to the treatment of the pathological conditions of the ovary.

We would remind the student that the common seat of an extra-uterine gestation is the tube, most frequently the ampulla ; that a previous inflammatory condition is a frequent cause ; that the ovum engrafts itself in the same way as it does in the uterus, the tubal mucosa making an abortive attempt to form a decidua ; that through the absence of decidual reaction the trophoblast of the ovum penetrates more rapidly and deeply than in intra-uterine gestation, and blood extravasation is more abundant ; that the production of a 'mole' is therefore common, which may be absorbed ; that if the ovum continues to grow it may break into the lumen of the tube, and remain there or be *expelled through the fimbriated end into the peritoneal cavity, causing a tubal abortion with internal hæmorrhage ;* that *rupture* of the tube may occur also with *internal hæmorrhage,* most serious and causing immediate danger to life when rupture takes place into the peritoneal cavity, less immediately dangerous when it occurs into the cellular tissue of the broad ligament. That the case may terminate thus, as far as the development of the embryo is concerned ; while occasionally the gestation may go on as an abdominal gestation in a sac formed of adhesions, which contains the fœtus in its membranes, the placenta remaining in the tube or becoming implanted on adjacent structures, through the chorionic villi acquiring attachments to the broad ligament, uterus, omentum or intestines. That

from the beginning the uterus undergoes sympathetic changes, becomes enlarged, and develops a decidua like the decidua vera of a normal pregnancy; that this decidua breaks down, leading to irregular hæmorrhage from the uterine cavity, and sometimes expulsion of the decidua, which simulates an abortion.

These pathological data give a basis for the clinical features which determine treatment.

The clinical picture varies indefinitely, from that of pregnancy complicated with some pain and occasional bleeding from the vagina to a sudden seizure producing an 'acute abdomen', with collapse, pallor and running pulse. The history given is of the possibility of pregnancy with symptoms coming on about the sixth week. The pregnancy may follow a period of sterility with pain at the periods suggestive of inflammation of the appendages. We have seen extra-uterine gestation in a first pregnancy, but usually the patient has had a child, but not for some years. Besides the six weeks' amenorrhœa there may be morning sickness and mammary enlargement. Then there are attacks of pelvic pain, for which no cause can be given. If these are not acute, extra-uterine gestation may not be thought of. When sudden and severe, and if there is faintness amounting to collapse, extra-uterine gestation at once suggests itself. Not to miss its occurrence, the possibility of it should always be in the mind of the practitioner *in all cases of pelvic pain in early pregnancy*. And he should not be thrown off his guard by the presence of vaginal hæmorrhage suggesting abortion.

As to physical signs, cases of tubal gestation used to be called hæmatosalpinx; and after rupture, hæmatocele or hæmatoma, according as the effused blood escaped into the peritoneal cavity or the cellular tissues. The size of the dilated tube varies. If small, it may not be recognised alongside of the enlarged soft uterus, and the case diagnosed as early pregnancy—the hæmorrhage from the empty uterus being set down to threatened abortion. Later on it may be mistaken for a cellulitis if lateral; and, if posterior, for a peritonitic effusion in the pouch of Douglas. A recent encysted effusion of blood into the peritoneal cavity may be exquisitely tender, suggesting acute inflammation; but there is no rise of temperature, in fact the temperature may be sub-normal. Considerable escape of blood produces an 'acute abdomen'. With great tenderness, a bimanual examination is impossible, and all we can say is that there is a tender fulness in the fornix, pointing to a pelvic cause for the acute symptoms.

It is rare to come on an extra-uterine gestation at a later date when about the fourth month a gestation sac in the pouch of Douglas, with the anterior wall of which the uterus is incorporated so that the cervix is drawn up and pushed forwards, simulates retroversion of the gravid uterus. We have seen more than one case in which this wrong diagnosis

was made : the symptoms of pain and internal hæmorrhage were not pronounced, there was complete amenorrhœa, and the patient sought advice because she could not pass her water, due to pressure on the urethra of the growing swelling in the pouch of Douglas.

The only treatment is operative, abdominal section to remove the tube. Till this is done, life is in danger from internal hæmorrhage. The patient ought to be placed in circumstances where this can be done at any moment—in a nursing home or hospital ward. The difficulty is to decide when this is necessary. The wise course for the practitioner is at once to call in the advice of an expert who can also undertake the operation. Till advice can be obtained, an ice-bag is applied ; the bowels moved by an enema, not an aperient ; and a morphia suppository given to relieve the pain and quiet the circulation. It is undesirable to keep the patient under morphia, as this obscures symptoms. Pelvic pain with the possibility of internal hæmorrhage should never be treated by fomenta- tions. *In all doubtful cases of pain apply cold :* it is an equally good treatment of an inflammatory condition, and relieves pain.

Sometimes when the internal hæmorrhage has not been severe, the case is not seen till a hæmatoma or hæmatocele has formed. If the patient objects to abdominal section, or the indications are not urgent, ice-bags are applied and the effusion may absorb. There is, however, the risk of fresh hæmorrhage or of suppuration. If the latter occurs, it is best to evacuate the pus *per vaginam* by an incision in the vaginal fornix, and drain the cavity.

Under affections of the ovary, we have to consider treatment of inflammation of the ovary—ovaritis, associated with which there may be prolapse ; of the cystic and cirrhotic ovary and of tumours of the ovary.

OVARITIS: THE CYSTIC AND CIRRHOTIC OVARY: OVARIAN TUMOURS.

In **Ovaritis**, which in its acute form is part of inflammation of the uterine appendages, the tube being usually the starting-point of the process, the ovary is enlarged and tender on palpation. It may be felt in its usual position or be prolapsed, occupying a lower level to one side of the uterus or lying behind it in the pouch of Douglas. The latter is most likely to occur when the uterus is retroverted. Pain is a prominent symptom, felt in the ovarian region of the affected side or in the pelvis generally, more rarely in one of the seats of sympathetic pain, as below the breast. It is increased by whatever disturbs the ovary or causes congestion, for example, any sudden exertion which forces the pelvic organs downwards. For the same reason there is pain on defæca- tion, especially when there is a tender prolapsed ovary in the pouch of Douglas ; pain also on examination or coitus, and at the menstrual period

in the pre-menstrual phase. It is worse for a day or two before the flow begins, and sometimes relieved by it.

In the *treatment*, therefore, of *acute ovaritis*, the first condition is rest from these causes of pain. Hot vaginal douches come next, as in all cases of pelvic inflammation, blistering in the uterine region is useful, especially at the menstrual period. The most important line of treatment is by vaginal tampons of glycerine, or better still, 10 per cent. ichthyol in glycerine. These benefit not only by withdrawing serum from the inflamed ovary, but have the special action of supporting the inflamed organ. Under a course of rest in bed for two or three weeks with douching and plugging and tonic aperients, the inflamed ovary becomes less tender and palpable and the prolapse less marked. Tonic aperients are of great value, for nothing increases pain more than constipation. Bromide or iodide of potassium may also be given, and the patient should be told to take special care at the monthly period. The recurring monthly congestion makes all pelvic inflammatory conditions tend to become chronic. Hence the need of care at this time.

The **cystic ovary** is the result of non-rupture of the Graafian follicles. The thickening of the tunica albuginea is usually due to inflammation on the surface of the ovary. Sometimes there is no evidence of previous inflammation. When the cystic ovary is tender, benefit will be derived by the same line of treatment, but the organ does not become reduced in size, and the question of its removal has to be considered. The indication here is pain which does not yield to palliative treatment. As the tube is usually involved and there is no advantage in leaving the tube when the ovary is removed, it is better to describe the operation as that for removal of the uterine appendages rather than oöphorectomy.

Chronic inflammation of the ovarian tissue may result in a **cirrhotic condition** of the ovary without dilatation of the follicles. The overgrowth of fibrous tissue in the substance of the ovary affects the nutrition of the follicles, with the result that they atrophy and many of them disappear. The ovary thus becomes smaller than normal, with an irregular, wrinkled surface and dense white appearance. The prominent symptom is pre-menstrual dysmenorrhœa, which may be so severe as to totally incapacitate the patient for some days before the period.

TUMOURS OF THE OVARY.

Of these the commonest is the multilocular ovarian cyst. When an 'ovarian tumour' is spoken of, it is this tumour that is usually meant, and to its removal the term 'ovariotomy' was first applied. For it ovariotomy is the only treatment, as, though not malignant like carcinoma or sarcoma, it kills the patient through exhaustion in the course of a few years.

OVARIOTOMY.

'We have symptoms of the same kind as we see towards the close of every lingering disease, betokening the gradual failure, first of one power, then of another; the flickering of the taper, which, as all can see, must soon go out. The appetite becomes more and more capricious, and at last no ingenuity of culinary skill can tempt it, while digestion fails even more rapidly, and the wasting body tells but too plainly how the little food nourishes still less and less. The pulse grows feebler, and the strength diminishes every day, and one by one each customary exertion is abandoned. At first the efforts made for the sake of the change which the sick so crave for are given up; then those for cleanliness; and lastly those for comfort—till at length one position is maintained all day long in spite of the cracking of the tender skin, it sufficing for the patient that respiration can go on quietly, and she can suffer undisturbed. Weariness drives away sleep, or sleep brings no refreshing. The mind alone, amid the general decay, remains undisturbed; but it is not cheered by those illusory hopes which gild, though with a false brightness, the decline of the consumptive; for step by step Death is felt to be advancing; the patient watches his approach as keenly as we, often with acuter perception of his nearness. We come to the sick chamber day by day to be idle spectators of a sad ceremony, and leave it humbled by the consciousness of the narrow limits which circumscribe the resources of our art.' Such is West's eloquent description of the termination of a case of 'ovarian disease' given in his 'Lectures on Gynecology', published in 1858, at that time the standard work on this subject. It makes one appreciate what Ephraim M'Dowell achieved when he performed the first ovariotomy in the 'backwoods of Kentucky'.

The student will find in Dr. William Fordyce's 'Presidential Address to the Edinburgh Obstetrical Society' an extremely interesting account not only of the operation, but also of M'Dowell's connection with Edinburgh University.[1] The operation was performed in 1809, but more than half a century elapsed before the technique was elaborated and ovariotomy made the simple and safe operation it is to-day, largely through the work of Spencer Wells in London and of Thomas Keith in Edinburgh.

At first the pedicle was treated extra-peritoneally, kept in a clamp resting on the skin of the abdominal wall, for security against hæmorrhage. Sloughing, with the risk of discharge passing into the peritoneal cavity, gave a mortality of 25 per cent. Ligature of the pedicle and dropping it into the peritoneal cavity has brought the mortality to nil in cases of uncomplicated ovariotomy. The most frequent complications are in-

[1] 'Transactions' for Session LXXX., 1920-21; also *Edinburgh Medical Journal*, March 1921.

testinal adhesions. It is noteworthy that while the peritoneum over a fibroid reaching to the umbilicus rarely shows adhesions to the bowel, these readily develop in the case of ovarian tumours, so that the removal of a large ovarian tumour may be a more difficult operation than hysterectomy for a fibroid of the same size. Hence the importance of not deferring operation even in the case of small tumours. Immediate operation is only called for in the case of acute complications : e.g. torsion of the pedicle. As a rule the operator can choose his time. The most comfortable for the patient is that between two menstrual periods, though the fact that menstruation is present is no reason against operating. As in all cases of abdominal section, it is an advantage that she keep in bed for a few days before it. The heart should be examined, the urine tested, and the temperature recorded. Details as to the operative technique will be given under 'Gynecological Operations'.

Tapping of the cyst is not a method of treatment followed by cure in the case of an ovarian tumour. It may cure a parovarian cyst, though these are now always removed by abdominal section. It has its place, however, in the course of an ovariotomy, to reduce the size of the tumour and allow it to be withdrawn through a smaller abdominal incision. But if the cyst contents be suspected to be *malignant*, or *infected* as in a case of torsion of the pedicle, the tumour should *not be tapped*, but removed entire. The same is true for *dermoid* tumours.

Tapping the abdomen may also be used for diagnostic purposes when ascites is present, but even here a small diagnostic incision is preferable.

While an ovarian tumour produces no symptoms in its early development, the patient not being aware of its presence until it rises out of the pelvis and begins to distend the abdomen, acute symptoms may arise due to **torsion of the pedicle**. The cause of torsion is not obvious, but it is more likely to occur in an ovarian tumour complicating pregnancy or the puerperium. The relaxed condition of the broad ligament and the changes in position of the uterus in pregnancy and after delivery, may explain the liability to its occurrence under these conditions. The specimen shown on Plate I. was obtained from a pregnant patient taken into the ward with an 'acute abdomen.' She had three months' amenorrhœa with abdominal distension corresponding to a sixth-month uterus. On abdominal section a large ovarian tumour was found with torsion of the pedicle, and a smaller one lying below the pregnant uterus in the pouch of Douglas. The drawing is an exact reproduction of the tumours after removal. The uterus is drawn in from another specimen at about the same period of gestation. The patient—a primipara—went to term and gave birth to her first and only child. It is a noteworthy fact that while operation may not be performed on the pregnant vulva, vagina or uterus without risk of induction of labour, tumours of the appendages may be removed without its occurrence.

PERITONITIS AND CELLULITIS.

As inflammation of the peritoneum and cellular tissue have a common cause and are often associated clinically, it is convenient to consider their treatment together.

The advance in knowledge of their etiology has influenced treatment. Peritonitis is now regarded not as a separate pathological entity, but as the final stage in an ascending process of infection which should be checked at an earlier stage. The large cellulitic exudations common many years ago are, due to the practice of aseptic midwifery, rarely seen by the gynecologist to-day, and when present they are to be regarded as beneficial—the earthworks thrown up to hold streptococcal invasion.

Fortunately, the anatomical relations of the pelvic peritoneum favour localisation—general peritonitis rarely follows pelvic peritonitis. Gonorrhœal peritonitis is localised to the area round the affected appendages; and peritonitis in the pouch of Douglas is roofed in by adherent intestines and omentum.

Treatment is prophylactic, medical and surgical.

Prophylactic Treatment consists in the early recognition and radical treatment of gonorrhœa, in strict asepsis in midwifery and in gynecological surgery, and occasionally in the early recognition and removal of an inflamed appendix which overhangs the pelvis.

As it is the recurrent pelvic congestion of the period which makes pelvic peritonitis frequent in the female, a patient who has had one attack should be warned against exposure to cold or over-fatigue at the menstrual period.

Medical Treatment.—In the *acute stage* pain is relieved by hot fomentations and a prolonged hot douche, which also stimulates the pelvic circulation and washes away infective discharge. A morphia suppository may be given after the bowels have been moved by an enema or castor oil. The condition of the pulse sometimes calls for alcohol or strychnine.

In the treatment of the *chronic stage* the first question is rest—how much is necessary? For this no rule can be laid down; one must bear in mind that rest to procure relief from pain may do more harm than good in the development of invalid habits. A certain amount of exercise in the open air with rest after it is the best combination. With regard to medicine, tonic aperients are of the first importance; then simple tonics such as iron and nux vomica; and to aid the removal of exudations, mercury or iodide of potassium. Local treatment includes the hot douche, vaginal tampons of glycerine or ichthyol and glycerine, blistering over the iliac region. Pelvic massage has been recommended for the absorption of exudations, but has not found acceptance in this country.

Surgical Treatment is directed to *cutting off a source of infection* from the uterine cavity by clearing out the uterus. After an abortion, for

example, by removing septic matter from the cavity by the finger or curette and sometimes simply by antiseptic uterine douching, we check infection which is keeping up a cellulitis or peritonitis.

Also to the treatment of *pelvic abscess*. This is produced in two ways : by the rupture of a pyosalpinx into the cellular tissues, or by a cellulitis being infected and going on to suppuration. Suppuration in an exudation is shown by rise in temperature, increase in size of the exudation, localised softening recognised on vaginal or rectal examination, and by leucocytosis.

An abscess above Poupart's ligament is opened with antiseptic precautions as in any other situation. When pus points *per vaginam* it is more difficult to deal with, owing to the risk of injuring bladder or bowel, the ureter or large blood-vessel.

The best way to proceed is to define the position of the bladder by sound, and of the rectum by the finger pressed into it, and then to make a small opening till the pus is reached, and enlarge it by an expanding instrument. After incising the vaginal mucosa, push in a pair of sinus forceps closed and then open them when they are fairly within the cavity. It is better to make the opening so large that the finger can be pushed in ; this not only ensures free drainage, but the finger-tip recognises the directions in which the abscess cavity runs, and can break down loculi in it, which may be present if it has developed, say, from a pyosalpinx. The cavity is washed out and packed with gauze, and alongside of the gauze a glass drainage-tube is inserted to keep the wound open after the gauze is withdrawn.

Besides curetting to check infection, and opening an abscess cavity, a third line of surgical treatment consists in *abdominal section*. There are three conditions in which this is called for :

1. To remove the permanent results of peritonitis by breaking down adhesions as in the treatment of retroversion, and inflamed appendages.

2. In tuberculous peritonitis, abdominal section gives excellent results. The mere drainage without the removal of tuberculous tissue does good, though in cases of tuberculous uterine appendages these have to be removed, and sometimes the uterus is removed with them.

3. In a third group of cases abdominal section is done to remove an infected uterus or tube which is a cause of pelvic suppuration. The treatment of suppurating peritonitis by opening the abdomen and washing out the pus belongs to obstetrics, as it is in cases of puerperal sepsis that this condition is usually found. But the removal of a septic uterus or tube which is the cause of chronic pelvic suppuration belongs to gynecology. Cases in which it is called for are extremely rare.

Abdominal section is also done in cases of malignant peritonitis. This is not treatment. It is diagnosis. The abdomen is opened, the condition recognised, and it has to be closed again.

Utero-sacral Cellulitis.—A common site for chronic cellulitis in the pelvis is the utero-sacral ligament. The infection in this case may proceed either from the cervix or from the rectum. The latter source accounts for the not infrequent cases in nulliparous women. As the result of cicatrisation following inflammation, shortening of the ligaments occurs. The uterus is thus pulled on at the junction of the body and cervix, and the condition of acquired anteflexion produced (see p. 21). The common symptoms are pain over the sacral region aggravated at the menstrual periods and on exertion, sometimes especially on defæcation ; and with the dysmenorrhœa there is sterility. Such cases should not be treated surgically by forcible dilatation, but along medical lines.

CONDITIONS IMMEDIATELY FOLLOWING LABOUR.

Under this heading we group three conditions which have not been already referred to, due directly to labour, though not coming under the
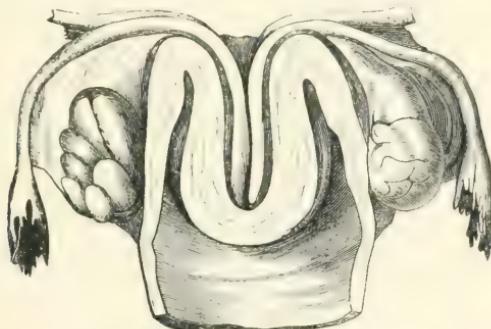
FIG. 31.—INVERSION OF UTERUS.
The fundus lies in the vagina ; the cervix is not inverted ; the lips
are seen as a flattened-out swelling below the angle of inversion.
The ovaries are not in the peritoneal cup.

attention of the gynecologist for some time later. These are—Inversion, Vesico-vaginal Fistula, Tear through the sphincter ani and Rectal Fistula.

Inversion of the uterus, usually placed among uterine displacements, arises during the third stage of labour or immediately after it. It belongs to the period when the changes of the third stage and its proper management were not understood, and is rarely met with to-day. Favoured by paralysis of the placental site, the old method of delivery by pulling on the umbilical cord from below instead of compressing the uterus from above, started it ; and a portion of the uterus falling into the cavity stimulated the rest to contract so that the uterus turned itself inside out, producing the result seen in fig. 31.

The treatment of recent inversion belongs to obstetrics; if not recognised till after the puerperium, it belongs to the gynecologist.

Gradual reposition may first be tried by the use of a cup placed on

Fig. 32.—Cup with Stem and Elastic Cords which are fixed to an Abdominal Belt, for Gradual Reduction of Inversion.

Fig. 33.—Section of Inverted Uterus removed by Supra-vaginal Hysterectomy Two Months after Confinement.

There had been no hæmorrhage or other symptoms during the puerperium. Note that the appendages do not descend into the peritoneal cup, and that the muscular wall of the uterus at the bottom of the latter is replaced by a folded layer of fatty tissue.

the inverted fundus, with a curved stem (fig. 32) fixed to an abdominal belt by elastic cords to keep up pressure. If this fails, the contracted ring of the cervix, which is the obstacle to reposition, may be divided by opening the abdomen and doing hysterotomy, as recommended by Haultain, or the inverted uterus may be removed by hysterectomy. The uterus seen as fig. 33 with fatty degeneration of the wall of the fundus shows that this may be the safer operative treatment, as this uterus when replaced would have ruptured in a subsequent pregnancy.

Inversion of the uterus may also be *due to tumours*. When the pedicle of a polypus is attached to the fundus, the expulsion of the
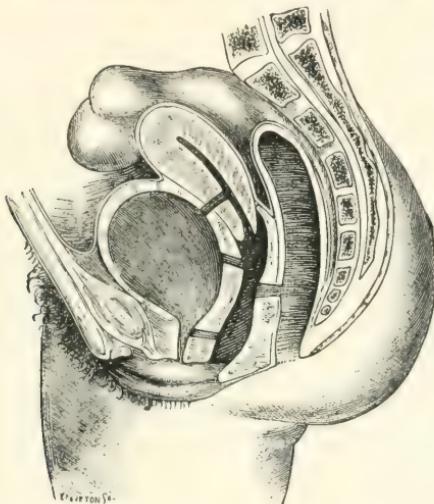
FIG. 34.—DIAGRAM REPRESENTING THE CHIEF VARIETIES OF URINARY FISTULÆ—URETHRO-VAGINAL, VESICO-VAGINAL, AND VESICO-UTERINE.

The seat of a Recto-vaginal Fistula is also indicated.

polypus may, by traction on the uterine wall, cause its partial inversion. This accident has been referred to in the treatment of polypi (p. 58).

Vesico-vaginal Fistula, the commonest form of urinary fistula, is produced during the second stage of labour. It arises in two ways, either through direct tear, in which case incontinence appears at once, or from sloughing due to prolonged pressure, where it is deferred for a few days till the slough separates. A direct tear results from too early application of forceps before the parts are dilated. Once the tear is started, further dilatation ceases and the tear runs into the bladder. A delayed second stage, causing prolonged pressure of the neck of the bladder between the foetal head and the pubis, leads to subsequent sloughing. Too early or too late application of forceps is thus a cause

of fistula. The commonest form is into the bladder—vesico-vaginal (fig. 34). Rarer are the urethro-vaginal and vesico-uterine. A large fistula is recognised by the finger, its exact position and extent being made out by passing the sound into the bladder. For smaller fistulæ the speculum is required, and it may be necessary to distend the bladder with a sterile coloured solution such as boiled milk, the oozing of which into the vagina shows where the fistula is. In vesico-uterine fistula the fluid exudes from the cervical canal, and in a ureteric fistula in which

FIG. 35.—COMPLETE
TEAR OF PERINEUM.

Note the end of the septum
separating vagina and
rectum, and the exposed
anal canal.

FIG. 36.—RECTO-VAGINAL TEAR,

the perineal part of which has healed, leaving
a recto-vaginal fistula above, through which a
bougie is passed from the rectum.

the ureter alone has been injured no fluid will escape from the distended bladder.

The treatment of fistulæ is operative and will be described under 'Gynecological Operations'.

Tear through the Sphincter Ani.—When the tear of the perineum passes through the perineum into the anal canal, known as 'a complete tear', there is no prolapse, but a new train of symptoms develop on the part of the bowel : incontinence of flatus or fæces, especially when the motions are loose. Why there should be no tendency to prolapse is not clear. Perhaps the rapid and more complete severance of deeper structures (complete tear occurs in cases of precipitate labour and too

rapid extraction with forceps) favour subsequent union and restoration of the pelvic floor above, while the retraction of the ends of the divided sphincter and infection from the rectum prevents union below. The appearance of the parts is shown in fig. 35, and whatever the explanation, the absence of prolapse is an interesting clinical phenomenon. Occasionally there is an attempt at union of the perineal portion, leaving a *recto-vaginal fistula* above—see fig. 34 and fig. 36.

For the treatment of a tear through the sphincter ani, see 'Gynecological Operations'.

It should be noted that vesico-vaginal and recto-vaginal fistulæ also develop in the *later stages of cancer*, when the disease has passed beyond the stage of operative treatment.

Of the pathological conditions of the vagina mentioned in 'Gynecological Diagnosis and Pathology', reference has already been made to vaginitis (p. 45), vaginismus and dyspareunia (p. 44) and fistulæ (p. 77). There remains to be considered

ATRESIA VAGINÆ: IMPERFORATE HYMEN.

The common form of atresia is due to an abnormality of the hymen known as *imperforate hymen*, the result of congenital defect, or vulvitis in early childhood, causing agglutination of the edges of the hymeneal orifice.

Atresia causes no symptoms, and is, as a rule, unrecognised until puberty. When menstruation commences, the menstrual blood cannot escape and collects in the vaginal cavity. The patient has symptoms of menstruation, but no discharge appears. Each month the amount of fluid is increased, distending in the first instance the vagina, and later the uterus, until the condition seen at fig. 37 is produced. To this the term *hæmatocolpos* (accumulation of blood in the vagina) has been applied. Occasionally there is some hæmorrhage into the Fallopian tube—hæmato-salpinx.

It is noteworthy that the blood does not coagulate (see p. 11), and does not tend to be absorbed, but persists as a thick, tar-like fluid.

The condition is recognised from the symptoms mentioned. At puberty the patient experiences menstrual molimina without the appearance of a discharge. As the vaginal sac distends, pain is felt in the pelvis at first only at the periods and then more continuously. With this there is also constitutional disturbance. The periods of suffering become more protracted, and the intervals of relief shorter. When the dilated vagina presses on the bladder and rectum it causes difficulty in micturition and defæcation. The abdomen swells, and this, with the amenorrhœa, sometimes causes suspicion of pregnancy. If the case is

left to itself, it terminates fatally through rupture of the uterus or cervix, or of a hæmato-salpinx, or through a septic peritonitis independent of rupture.

The diagnosis is easy when the atresia is at the hymen ; on separating
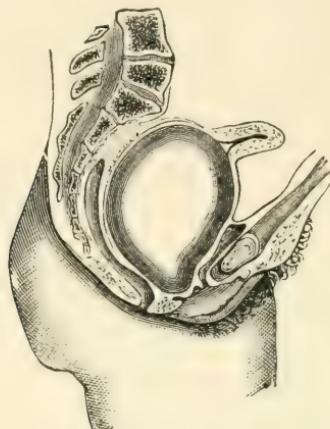
FIG. 37.—ATRESIA OF HYMEN.
Note the bulging of the hymen and the cystic tumour occupying the pelvis, recognised by the finger per rectum.

the labia the bulging swelling of the hymen is visible, and examination per rectum shows the cystic swelling in the pelvis (fig. 37).

The treatment is to make an incision in the hymen, allow the fluid to escape slowly, and wash out the cavity thoroughly. The opening is then dilated sufficiently with the finger to allow a glass dilator to be inserted
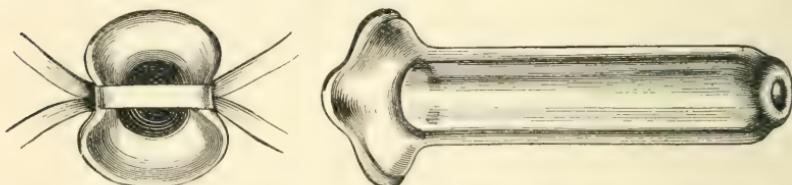
FIG. 38.—PERFORATED GLASS DILATOR, TO BE USED AFTER OPERATION FOR ATRESIA VAGINÆ.
The left-hand figure shows the external end of the tube with the tapes attached.

(fig. 38), which is kept in position by tapes fixed to an abdominal binder. The dilator is kept in for a week or ten days.

The very rare condition of atresia of the lower third of the vagina requires a dissection between the rectum and urethra to form a new canal.

GYNECOLOGICAL OPERATIONS.

The various gynecological operations are conveniently subdivided into operations on the vulva, vagina, cervix and uterine cavity, which are known as **Minor** gynecological operations in contra distinction to operations on the uterus and its appendages ; which, as the peritoneal cavity is opened into, are described as **Major** operations. These major operations include *fixation of the uterus* for backward displacements, and its removal, *hysterectomy ;* operations on the Fallopian tube, *e.g.* its *removal* for *pyosalpinx* and *extra-uterine gestation ;* operations on the ovary, *e.g.* the removal of the cystic and cirrhotic ovary, *oöphorectomy,* or when the tube is removed with it, *removal of the uterine appendages ;* removal of ovarian tumours, *ovariotomy,* and of broad ligament cysts.

In the majority of cases the peritoneal cavity is opened into through the abdominal wall by abdominal section ; but in certain cases this may be done through the vagina.

Under minor operations we take up first *dilatation of the cervix* and *curetting,* as these are most frequently called for.

DILATATION OF THE CERVIX.

Dilatation of the cervix is performed by itself in the treatment of dysmenorrhœa and sterility, and also as a preliminary to curetting the

Fig. 39.—Graduated Metal Dilator.
The two ends are of different diameters. Each set contains a series of these instruments, varying in diameter.
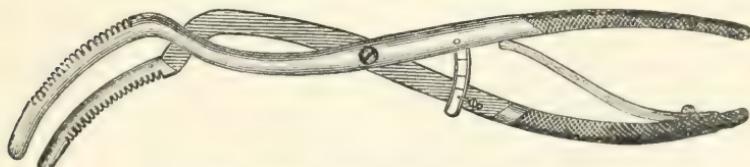
Fig. 40.—Schultze's Dilator.

uterus, or passing the finger into the uterine cavity to clear out an incomplete abortion or to diagnose a tumour. A metal instrument is used (not a tent as formerly), which can be sterilised ; and there are two types : the graduated dilator (fig. 39) and the expanding ones (figs.

6

40, 41). The graduated dilator is preferable, as it does not tear the cervix.
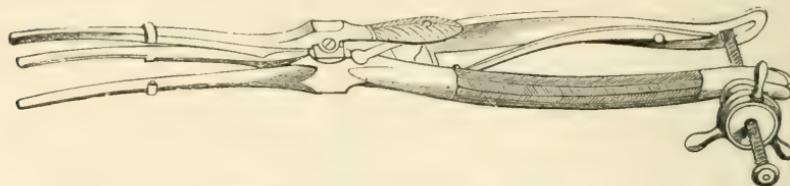
FIG. 41.—MARION SIMS' DILATOR.
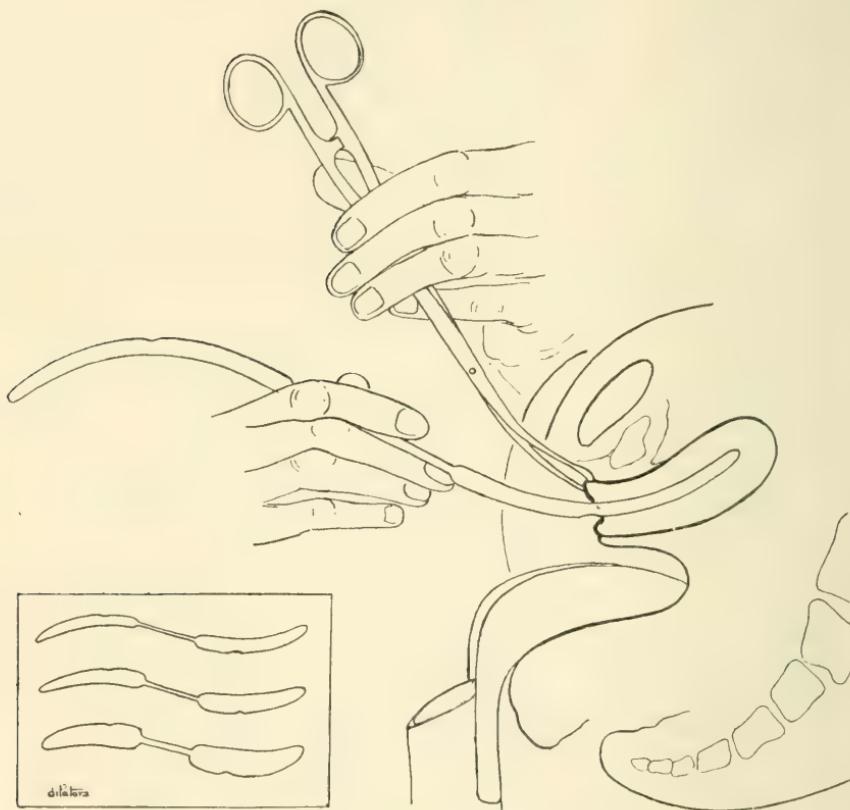
FIG. 42.—DILATATION OF THE CERVIX.

The dilators are graduated, a different size on either end of the shaft, which is held as in diagram. The cervix is drawn down and fixed with the volsella. The dilator is passed with its curvature corresponding to the direction of the uterus as ascertained on bimanual examination—in this case forwards; and pushed in up to the 2½-inch notch. The degree of dilatation depends on what is to be introduced, the largest dilator being necessary when the finger is to be inserted, as in fig. 46.

The patient is placed in the lithotomy posture, the vulva and vagina prepared by washing and douching, or with iodine, and a careful bimanual made to determine the position of the uterus and exclude any inflammatory conditions which are a contra-indication to operation, e.g. utero-sacral cellulitis, or inflammation of the appendages. The cervix is laid hold of by volsellæ, a firm grip being taken ; where there is likely to be resistance to dilatation, two volsellæ may be applied. The sound is passed to determine not only the size of the uterus but its exact position. Holding it lightly in the fingers, it is moved up and down until the operator sees, as it were, the exact direction of the uterine canal. The graduated dilator is held by the shaft between the thumb and the first finger, the curvature of the instrument being forwards, so as to correspond with that of the uterus (fig. 42). As little force should be used as possible in introducing it, the dilator being allowed to feel its way in. Once it has passed the cervix, the shaft is pressed backwards so as to make use of the curvature of the instrument in facilitating its passing in. Should the uterus be retroverted, the process is reversed : the dilator is introduced with its curvature looking backwards, and the shaft carried forward as the instrument passes in. Each dilator is pushed in up to the shoulder, withdrawn slightly, and then pushed home again, the next size not being used until the one in use passes easily. If there is resistance to its passage, or if there is difficulty in withdrawing it, suggesting spasm of the muscular fibre, the dilator should lie in the canal until there is relaxation before the next size is introduced.

In treating dysmenorrhœa, dilatation may be carried to a further degree than in the operation of curetting—up to a No. 12 dilator. After dilatation the uterine cavity may be washed out with the intra-uterine catheter. The best time for operation is just before the period, as the cervix relaxes more easily then. There is also the advantage that the effect of the operation can be immediately observed. The patient should keep her bed for a week after it.

Division of the Cervix is an alternative to dilatation. In the treatment of cervical catarrh in nulliparæ, we spoke of notching the cervix with scissors to allow the mucus to escape. This may be carried further by making a deeper cut into the cervix laterally (lateral division) so as to split the cervix into two lips, or by making a still deeper mesial incision posteriorly as far as the posterior fornix. A wedge-shaped piece must be cut out of each of the raw surfaces thus produced to allow the cervical mucosa to be turned in and stitched over it—Dudley's operation. Such a plastic operation to widen the os externum may be done where sterility, not dysmenorrhœa, is the chief symptom. Personally we prefer forcible dilatation, in all cases, to a plastic operation, as it is an equally good method of dealing with sterility so far as this may be explained on mechanical grounds.

CURETTING.

By this is meant scraping of the cavity of the uterus to bring away portions of mucosa for diagnosis or treatment (see p. 48). It should be noted that while the mucosa of the body of the uterus is easily removed, and can be brought away by the loop curette in a strip for examination, that of the cervix does not come away so easily, but must be dug out with the spoon.

There are two types of curette : with a loop and with a cutting edge—
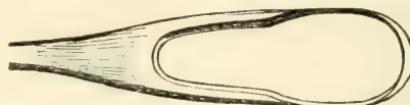
FIG. 43.—LOOP CURETTE.   (¼.)

used from above downwards only (fig. 43) ; with a spoon or scoop-shaped end—used from above downwards and from side to side (fig. 44).

After the cervix has been dilated to an extent sufficient for the curette to pass, the operator grasps the curette in the hand, with the forefinger placed on the shaft on the opposite side from the cutting edge, so as to determine the amount of pressure used (fig. 45) ; brings it steadily down the posterior wall of the uterus and out at the os, relaxing the pressure as the end of the instrument passes through the cervical canal. The strip of tissue removed is set aside for microscopic examination. A strip is taken in the same way off the anterior wall. Then the curette is drawn

FIG. 44.—MARTIN'S CURETTE.

over the rest of the walls without withdrawing the instrument, across the fundus and down the angles of junction of the walls, special care being taken to clear out the Fallopian tube corners. After curetting, the cavity is washed out with sterile water (see p. 16). This washing should be done into a basin, from which any further fragments of tissue washed out may be collected for examination.

There is difference of opinion as to whether an intra-uterine application is necessary after curetting. We always apply pure carbolic acid or iodised phenol, as described in the treatment of endometritis (see p. 48).

Sometimes the finger is used instead of the curette to explore the uterine cavity, and fig. 46 shows how the abdominal hand may be used to press down the uterus on the finger, e.g. in clearing out an abortion.
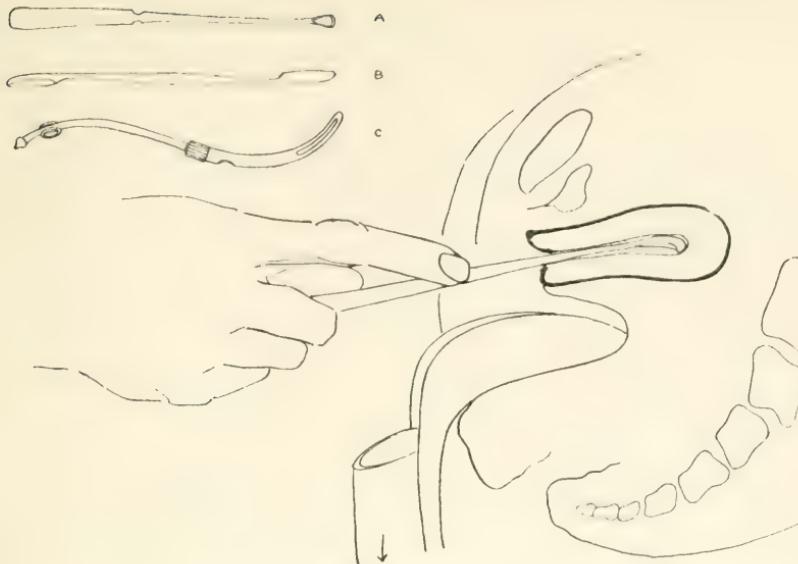
FIG. 45.—CURETTAGE.

The curette has a loop end (A) or a scoop-shaped end (B).   Note that the
cervix has to be dilated sufficiently to admit the curette and that the
uterus is drawn down and straightened out in curetting.   The volsella,
drawing down and fixing the cervix as in fig. 42, is not shown.   After
curetting, the uterus is washed out with a two-way catheter (C).   The
fragments of endometrium removed are collected in a dish placed beneath
the tubular handle of the speculum.
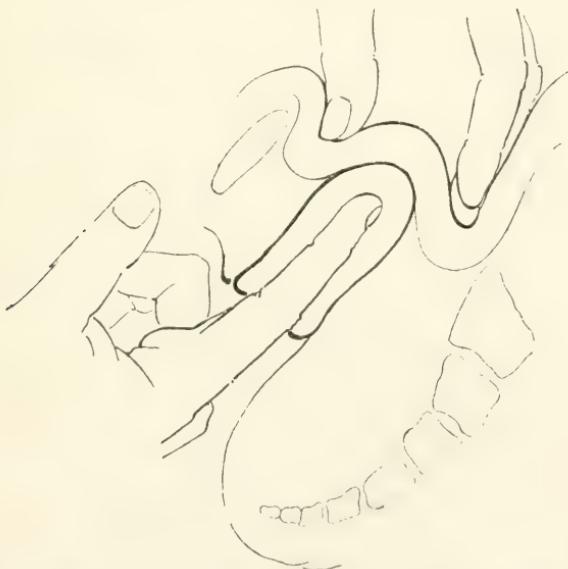
FIG. 46.—EXAMINATION OF THE UTERINE CAVITY WITH THE FINGER.

Note that the fingers of the upper hand are used to press down the fundus on
the uterine finger, thus making sure that the latter reaches the fundus.
This manœuvre is useful in clearing out the remains of an abortion, and
in determining the attachments of a polypus, or the situation and extent
of a malignant affection of the endometrium.

EMMET'S OPERATION: TRACHELORRHAPHY.

The student will not have gone far in the clinical study of Gynecology without noting the large number of patients who refer the commencement of their illness to a confinement or miscarriage. They come complaining of various ailments—a weak back, pain in the side, white discharge, losing too much at the monthly time, or general unfitness for work. On physical examination, he finds a variety of conditions—a fissured and thickened velvety cervix, thickenings in the lateral fornices or behind the uterus often displacing it by traction, and the uterus itself enlarged. We do not mean that all of these are present in one case, but that one or more of them may be ; nor is any one symptom invariably connected with one lesion. He asks himself why labour is so often the starting-point of female complaints ; and one important reason, though by no means the only one, is that the tear of the cervix in labour literally opens the door to a variety of lesions. Cervical catarrh is favoured, if not started (as Emmet said), by the split condition of the cervix ; the raw surface has admitted septic matter, which leads to chronic inflammation of the parametrium with all the changes in the train of parametritis ; and subinvolution is kept up indirectly by the consequent parametritis.
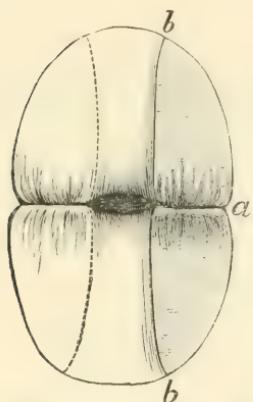
FIG. 47.—*a, b.* DENUDED AREA.

Emmet of New York introduced the operation for repair of a laceration, which is associated with his name—a simple and more suggestive term than trachelorrhaphy (repair of the cervix). Unfortunately the consequences of laceration have gone too far for much good to be done simply by the closure of an old laceration ; it is like closing the stable door after the horse has been stolen. Where the cervix is enlarged and indurated, we prefer its amputation, which removes the diseased tissue. In certain cases, the operation still has its place and is performed as follows.

The patient is placed under choloroform in the lithotomy posture ; and the field of operation having been thoroughly cleansed, the speculum is passed and the cervix laid hold of with the volsella and drawn down. The uterus may be curetted at this stage, as there is usually endometritis associated with the condition of the cervix. Draw the edges of the laceration together with tenacula to see how much tissue must be pared from the edges of the cleft to allow it to be sewed up. Pare the edges of the laceration with the scissors or knife ; scissors are prefer-

able, because they cut with greater ease and rapidity. With long-bladed scissors we can remove the tissue from one face of the laceration with a steady clean cut right into the angle : when the laceration is bilateral this is done on both sides (fig. 47). The sutures are now introduced
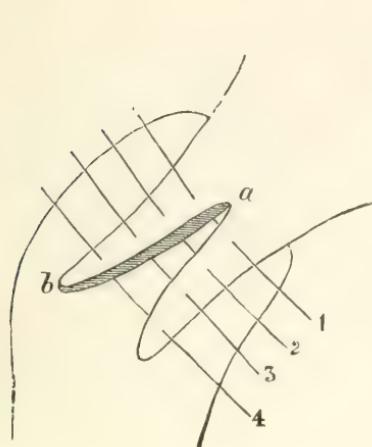
FIG. 48.—MODE OF PASSING SUTURES.
a, b. Denuded surface as in fig. 47. The sutures are passed in order as numbered.
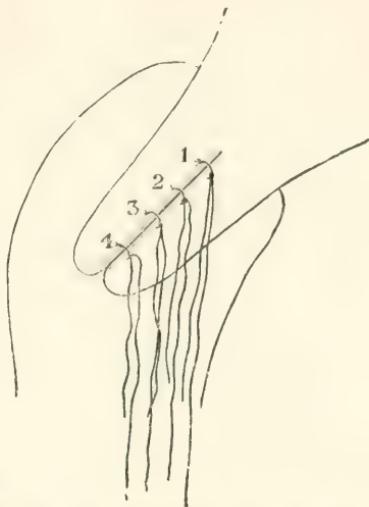
FIG. 49.--SUTURES TIED BUT NOT CUT SHORT.

(figs. 48, 49). Strong sutures are necessary, as some force is needed to tie them tight ; if silk or silk-worm gut is used, the sutures are removed after ten days.

AMPUTATION OF THE CERVIX.

This operation is called for in primary simple hypertrophy of the cervix—a very rare condition ; in hypertrophy due to chronic inflammation, to remove the diseased mucosa and indurated tissue beneath ; and to reduce the size of the uterus in the operative treatment of prolapse.

Draw down the cervix and divide it with scissors on either side so as to split it into an anterior and a posterior lip. Cut a wedge out of each, to allow the mucous membrane surfaces to be approximated (figs. 50, 51). Stitch the vaginal mucosa to the cervical mucosa in the middle area to keep the cervical canal open, and vaginal to vaginal at the sides towards the lateral fornices (fig. 52). Fig. 53 shows the result.

Amputation of the cervix, easy when only the vaginal portion is removed, is more difficult when the supra-vaginal part is removed also—

Fig. 50.—Splitting the Cervix into an Anterior and a Posterior Lip, with Excision of a Wedge from each Lip.
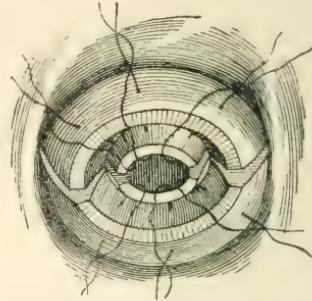
Fig. 51.—Excision of Wedge from each Lip.

due to the presence of the bladder in front, and branches of the uterine artery to the cervix at the sides.

In operating to remove the **hypertrophied cervix in prolapse,** the
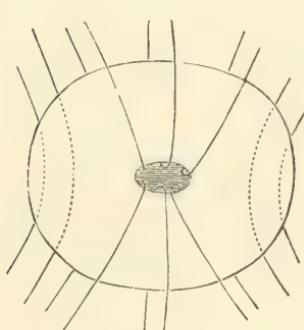
Fig. 52.—Position of Sutures before they are tied.
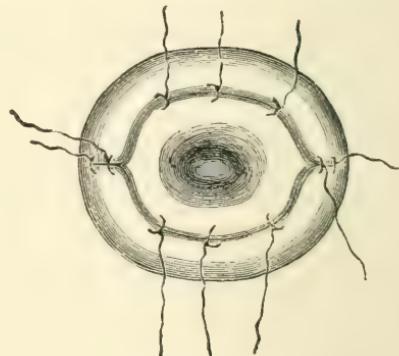
Fig. 53.—Appearance of Cervix when Sutures are tied.

sound is passed into the bladder to define how far it comes down (cf. fig. 54). A circular incision is made at this level through the mucous membrane. This exposes the bladder wall anteriorly, and the bladder is sponged off the cervix. The mucosa of the anterior vaginal wall is, in the

middle area, stitched to that of the cervical canal, as in fig. 50, but at a higher level. If anterior colporrhaphy is done at the same time, the transverse incision (see fig. 58) is carried into the circular one round the
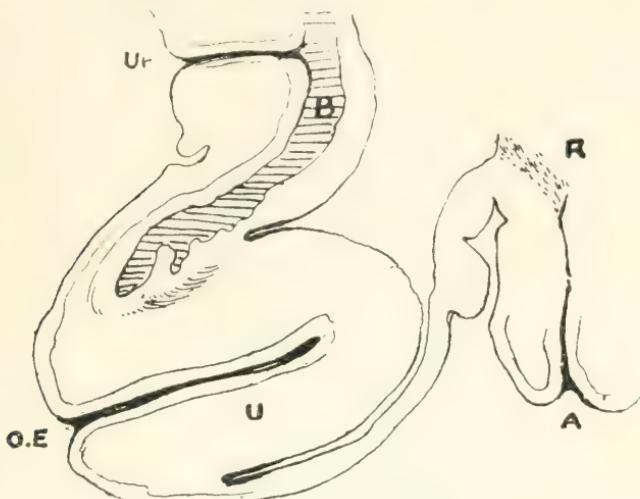
FIG. 54.—PROLAPSED UTERUS IN SECTION.

B. Bladder ; Ur. Urethra ; U. Uterus ; O.E. Os Externum ;
R. Rectum ; A. Anus. Note that the bladder descends
so as to lie behind the everted anterior vaginal wall.

cervix, and the bladder exposed and sponged back when the colporrhaphy is being done.

VESICO-VAGINAL FISTULA.

There are two essentials for successful operative treatment : (1) complete exposure of the fistula, so that (2) the edges may be thoroughly pared and carefully adapted with sutures. The great difficulty lies in the inaccessibility of the field of operation, to which the failure of the older operative measures is chiefly to be attributed.

Marion Sims (1849) first rendered successful treatment possible by the complete exposure of the fistula with his speculum, and by the careful adaptation of its margins with silver wire sutures. Silk-worm gut or catgut has replaced the wire suture. The advantage of catgut is that it is absorbed ; sometimes it absorbs too soon, and where there is tension in approximating the edges silk-worm gut is preferable.

Good light is essential, and complete exposure of the field of operation. The paring of the edges is shown in fig. 55. The cervix is drawn

down by sutures passed through it instead of volsella; and a metal catheter passed into the bladder, which may be used to make the margin of the fistula stand out, or to keep back the mucosa of the bladder if it tends to protrude. The ring of vaginal mucosa to be removed is marked out and then transfixed by the narrow-pointed knife, which is carried round the opening so as to remove the tissue in one piece if possible.
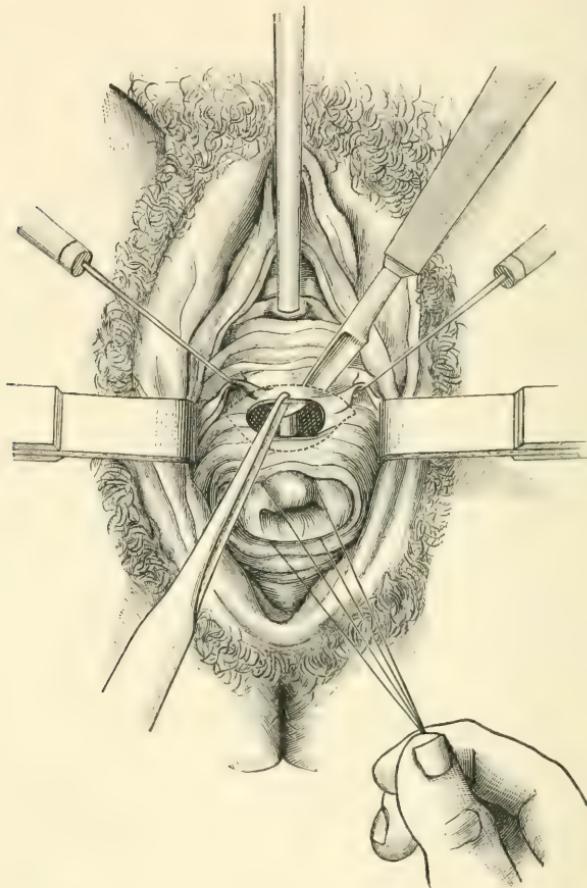
FIG. 55.—PARING THE EDGES OF A VESICO-VAGINAL FISTULA.

The adaptation of the edges with interrupted sutures must be carefully done. The needle is passed through the mucosa external to the raw area and the suture brought out as deep in the raw surface as possible without going through the vesical mucosa, then entered deeply at the opposite edge, and brought out through the vaginal mucosa clear of the raw surface. *All the sutures are passed* before they are tied. The

bladder is then carefully washed out by a catheter, passed by the urethra, to remove any blood-clot through the wound. The sutures are then tied.

Instead of producing a raw surface by *paring*, as in fig. 55, the edges of the fistula *may be split* (fig. 56), so that the vesical mucous membrane is separated from that of the vagina when the opposed raw surfaces are drawn together. If the bladder can be separated from the vagina all
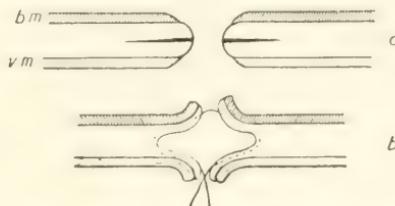
FIG. 56.—SPLITTING THE MARGINS OF A FISTULA.
b.m. Bladder Mucosa; *v.m.* Vaginal Mucosa. *a.* Incision; *b.* Free edges turned towards Bladder and Vagina respectively.

round, a better result is obtained by suturing the vesical and vaginal mucosa separately. The former is drawn together by a purse-string buried catgut suture, so that when the hole in the bladder is closed its edges are inverted. If the hole is large, interrupted sutures are necessary. The vaginal mucosa is then united by superficial sutures.

After closing the fistula, a stationary catheter is placed in the bladder to drain it for some days

REPAIR OF PERINEUM: COLPORRHAPHY.

Repair of the perineum is performed where there is slight prolapse, as a substitute for treatment by pessary. It is combined with *posterior colporrhaphy* in cases of partial prolapse.

The steps of the operation are indicated in fig. 57.

In studying diagrams of operations on the vulvar orifice the student must remember that what is represented as a flat surface is a re-entrant angle: the paper should be folded on itself in the middle line vertically to the vulvar orifice, to show how the mucous membrane edges and raw surfaces on the opposite sides of the orifice can be brought together by sutures.

The first step in the operation consists in affixing a pair of pressure forceps to the muco-cutaneous junction on each side at the posterior end of the labium minus. By approximating these forceps in the middle line the size of the new vaginal orifice is determined. A U-shaped incision is
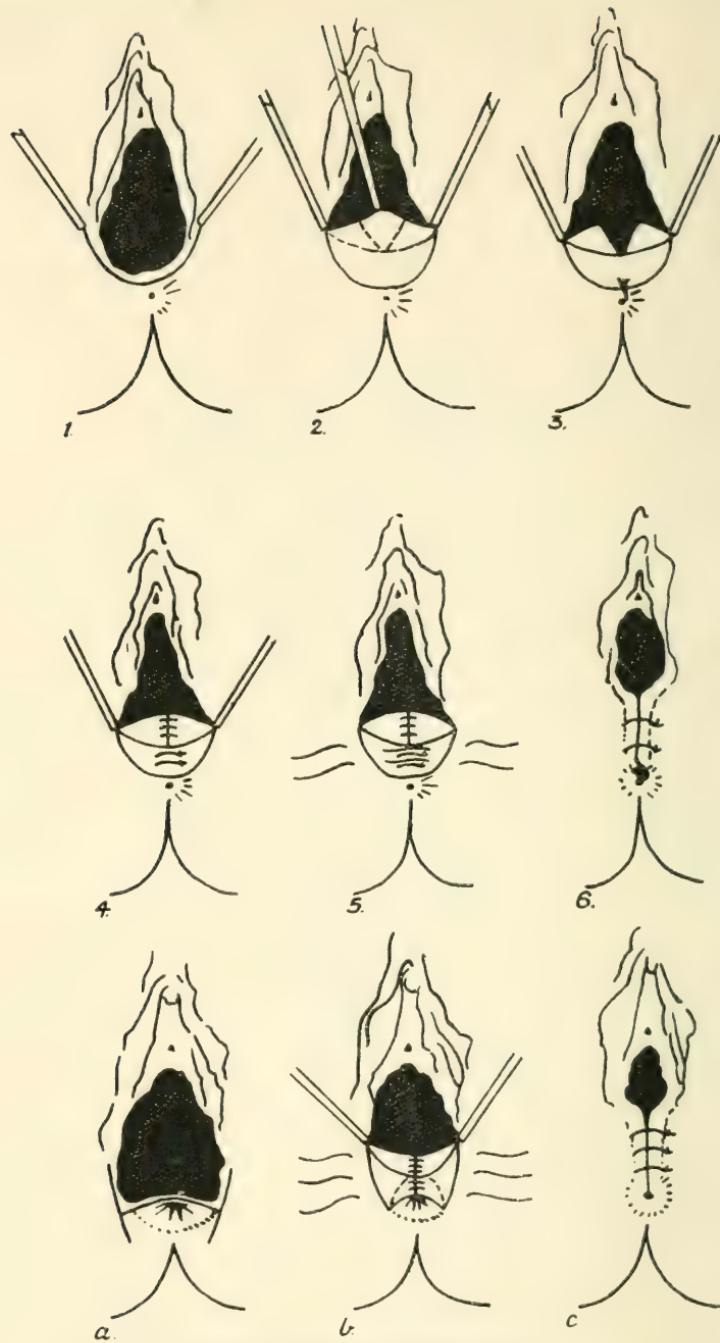
FIG. 57.—REPAIR OF PERINEUM.

1-6. Steps in operation for repair of the perineum ; a-c. Operation to restore sphincter ani in a 'complete tear'.

now made along the muco-cutaneous junction from one forceps to the other (fig. 57—*1*).

The second step consists in raising a flap of vaginal mucous membrane. The presence of old cicatricial tissue in the site of the old perineal tear makes the early stage of this dissection difficult; and lest the anterior rectal wall should be damaged, it is essential to keep as close as possible to the vaginal mucosa. After the plane of cleavage between vagina and rectum has been struck, the dissection can rapidly be completed by the finger and gauze.

Hæmorrhage at this stage is apt to be troublesome, and should be checked as far as possible by forceps and ligature. Mere oozing will be controlled when the deeper structures are brought together by sutures.

The third step consists in removing a V-shaped portion (fig. 57—*3*) of the flap of redundant mucosa (see dotted line, fig. 57—*2*) which has been laid hold of by forceps as shown in *2*. The margins of this V-shaped portion are now brought together by sutures restoring the posterior vaginal wall. This constitutes **posterior colporrhaphy**. It should be noted that in fig. 57—*4, 5* the margins of the vaginal mucosa outside the wedge are not yet brought together by sutures. This is done before the sutures to unite the margins of the skin wound are tied.

In the deep part of the wound the margins of the levator ani muscle and pelvic fascia can be felt on either side with the finger and thumb, and the next step consists in inserting deep strong catgut sutures so as to approximate the fascia and the edges of the muscle in the middle line in front of the rectum. These buried sutures are seen tied and cut short in fig. 57—*4*. Lastly, the margins of the wound are approximated with silkworm gut (fig. 57—*5, 6*).

The Operation for Complete Tear.—Where complete rupture of the perineum has occurred, the anal sphincter being torn through, a more extensive operation is required. The dotted line in fig. 57—*a* shows the H-shaped incision employed, the anterior limbs of which correspond to the incision for incomplete tear. The posterior part embracing the anterior portion of the anal orifice is made to give access to the lacerated sphincter (the posterior ends of the incision should pass outside the retracted end of the sphincter shown by puckering of the skin). The recto-vaginal septum is split and the posterior vaginal flap dissected up as described in the previous operation. The tear in the bowel is now completely exposed and repaired by a series of strong interrupted Lembert sutures introduced in such a manner as to infold the torn margins into the lumen of the rectum (fig. 57—*b*). The retracted ends of the torn sphincter are brought together in front of the anus by a special stitch. The remainder of the operation is completed as described in the operation for incomplete tear (fig. 57—*b, c*).

Anterior Colporrhaphy.—This operation is employed in the radical

cure of cystocele, whether in connection with prolapse or apart from it. The vulva and pubes are shaved and the skin prepared with soap spirit and iodine the night before ; immediately before operation a douche is given, and the vagina, vulva and surrounding parts swabbed thoroughly with iodine.   The operation may be divided into four steps :

1. A self-retaining speculum having been introduced into the vagina, the cervix is drawn down to the vulva with a volsella.   The lower limit of the bladder is determined by means of a sound introduced into the urethra, and below this point a small transverse incision is made on the anterior wall of the cervix passing only through the mucous membrane. A pair of straight blunt-pointed scissors is then inserted on the flat
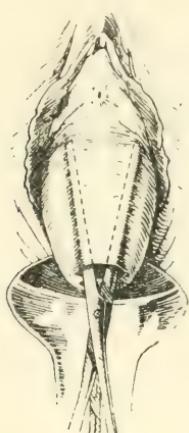
Fig. 58.
ANTERIOR COLPORRHAPHY.
1. Separation of vaginal mucosa from bladder.
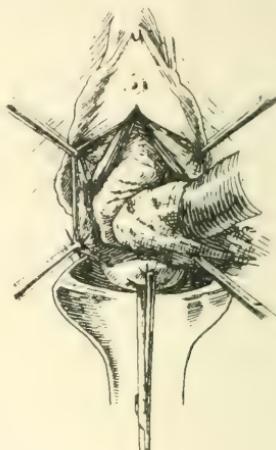
Fig. 59.
ANTERIOR COLPORRHAPHY.
2. After division of the vaginal mucosa the bladder is separated and pushed upwards.

through this incision and pushed upwards in the cellular tissue space immediately underneath the vaginal mucosa, till the scissors reach a point half an inch short of the urinary meatus.   By separating the blades the loose cellular tissue plane between bladder and vagina is opened up, and the vaginal mucous membrane can be separated extensively from the underlying bladder (fig. 58).

2. The separated mucous membrane is now split with scissors in the middle line, and the cut edges seized with forceps.   By the finger (fig. 59) and gauze and a few snips with the scissors, the bladder is freely cleared from the vaginal walls at the sides and from the cervix behind, and is pushed upwards behind the symphysis pubis.   Bleeding points are seized with forceps and ligatured.

3. Buried sutures are now passed to bring together the musculo-fascial supports of the bladder (fig. 60), and tied.
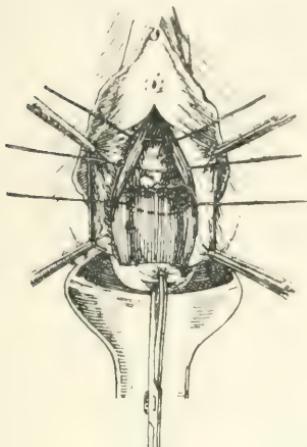
FIG. 60.

ANTERIOR COLPORRHAPHY.

3 Sutures are passed to unite the musculo-fascial supports of the bladder.

FIG. 61.

ANTERIOR COLPORRHAPHY.

4. The redundant vaginal mucosa having been cut away, the edges are approximated.

4. The redundant mucosa in the bite of the forceps is cut away and the edges approximated by a continuous catgut suture (fig. 61).

MAJOR GYNECOLOGICAL OPERATIONS

For the preparation of the patient the student is referred to a text-book of Surgery. Details as to this will be found in Berkeley and Bonney's 'Gynecological Surgery', which also gives information as to the requirements for the operating theatre, and for operations in private. Reference is necessary, however, to the position of the patient and the abdominal incision. In the large proportion of cases, the patient is put at once in the Trendelenburg position (fig. 62). In this position, as soon as the peritoneum is touched with the knife, air passes in and the intes-

FIG. 62.—TABLE RAISED SO AS TO BRING PATIENT INTO
TRENDELENBURG POSTURE.

tines fall back into the abdomen, so that a clear view of the pelvic organs is obtained. In cases of the removal of a large tumour or where it is necessary to prevent the gravitation of fluid from the pelvis into the abdomen, e.g. of infected matter in a septic case or of blood in extra-uterine gestation, the operation is begun with the patient horizontal.

The incision, when made in the middle line, begins just above the pubes and extends for 4 inches upwards, sufficient to admit the hand. It may have to be increased later according to the size of the tumour

to be removed or to give greater access to the field of operation. Where there is the possibility of upward displacement of the bladder by a tumour the incision is made farther up and then extended downwards as far as the reflection of the utero-vesical peritoneum.

FIXATION OF THE UTERUS BY GILLIAM'S OPERATION.

There are many methods of operation for the radical treatment of backward displacements (see p. 31). The same result may be obtained in different ways, and we describe as a type that in which the round ligament is brought through an artificial opening in the abdominal wall and stitched to the fascia over the rectus by Gilliam's operation.

The steps in the operation are as follows (see fig. 63) :

1. The abdominal cavity is opened in the middle line and the superficial fascia reflected off the fascia covering the rectus on either side, in the lower part of the wound (fig. 63—*1*).

The hand is passed into the pelvis to grasp the retroverted uterus and bring it forwards towards the incision.

2. A traction (temporary) suture is passed under the round ligament on both sides about $1\frac{1}{2}$ inches from the angle of the uterus (fig. 63—*2*).

3. A pair of sinus forceps is pushed vertically through the fascia, rectus and peritoneum (fig. 63—*3, a*) about 1 inch from the edge of the incision ; the traction suture is laid hold of and drawn through so as to pull the ligament after it (fig. 63—*3, b*). This is done on both sides, and the ligament allowed to slip back again into the abdominal cavity while the peritoneum, muscle and fascia are being united.
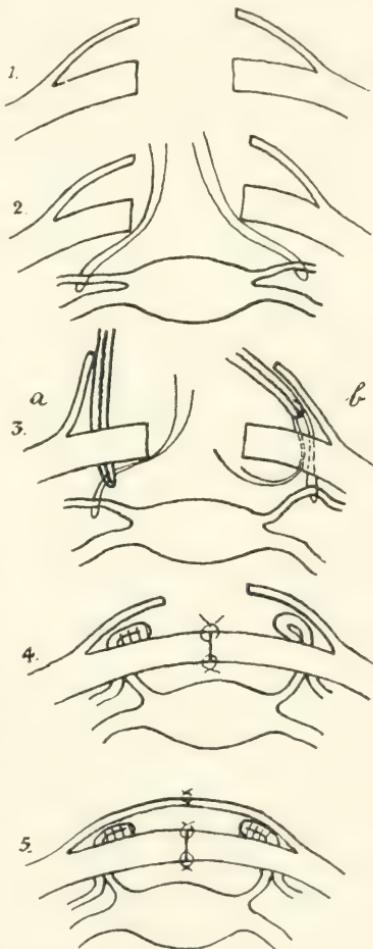
FIG. 63.—STEPS IN GILLIAM'S OPERATION.

7

4. The ligaments are now drawn through and stitched to the surface of the fascia (fig. 63—4).

5. The skin and superficial fascia are closed in over them, with the result shown in fig. 63—5.

Instead of pushing straight forceps vertically through the wall, a pair of longer slightly curved forceps may be pushed obliquely through the wall so as to reach the peritoneum at the internal abdominal ring (fig. 64—a); then by swinging the handle of the forceps outward (to b in fig. 64) their points are made to travel underneath the anterior layer of the broad ligament, and pierce it near to the uterus, where the traction suture is laid hold of. In this way the loop of ligament, instead of passing directly forwards, takes its natural course outwards and forwards towards the internal abdominal ring.

We have described the operation in a case of a movable uncomplicated retroversion. If the uterus is fixed by adhesions in the pouch
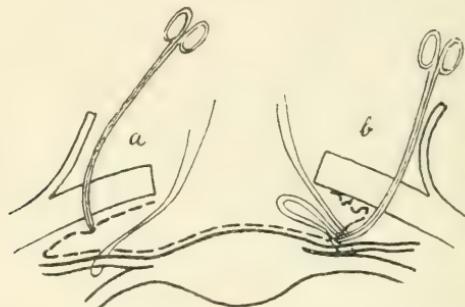
FIG. 64.—USE OF LONG CURVED FORCEPS IN THIRD STEP OF GILLIAM'S OPERATION.

of Douglas, these are separated by the finger, before lifting the uterus forwards. If the retroversion is complicated with enlarged appendages, these are tied off and removed before passing the traction sutures.

MYOMECTOMY.

When a fibroid tumour—from its situation, subperitoneal, or its size, e.g. a small interstitial tumour—does not call for removal of the uterus, the tumour alone may be removed by myomectomy.

If subperitoneal, the pedicle is tied off and the peritoneum brought over the stump. If interstitial, the uterine wall is incised over the tumour, the tumour shelled out of its areolar tissue bed (vide p. 53), the cavity closed by deep interrupted sutures and the peritoneum united by a continuous suture. The risk of hæmorrhage and sepsis makes hysterectomy the safer operation for interstitial tumours; but in the case of a young patient who is desirous of having a child, myomectomy may be done.

OVARIAN ARTERY

ROUND LIG.

UTERINE ARTERY WITH BRANCH TO VAGINA.
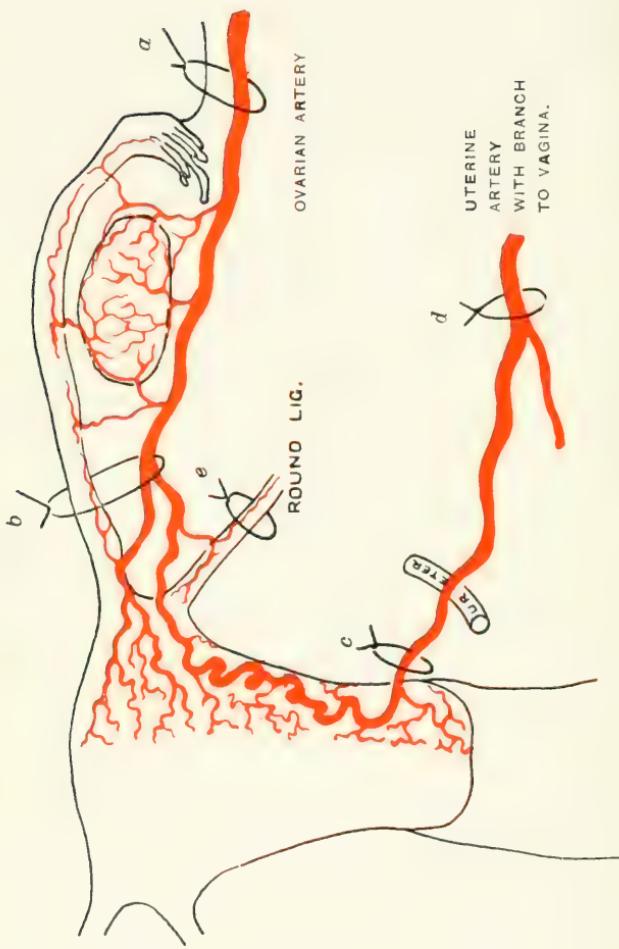
PLATE III.

Arterial supply of uterus and its appendages, and position of ligatures.

HYSTERECTOMY.

For hysterectomy the course of the blood-vessels and the relations of the peritoneum are of importance.

The blood-supply comes from the ovarian and uterine arteries; there is also a small artery in the round ligament which requires to be ligatured.

As both vessels lie in the broad ligament, clamping the broad ligaments on both sides controls all haemorrhage. Further, in tying off vessels in one broad ligament, forceps must be applied to the uterine end of the cut vessels to prevent haemorrhage due to anastomosis of the vessels of the opposite side or reflux of blood from the tumour. The usual method is to apply two forceps to the vessel and divide between; and after the uterus is removed, ligature the vessel as it lies in the bite of the forceps left in the pelvis. To prevent the ligature slipping, it is not thrown round the end of the forceps, but introduced *on a needle* below the forceps and tied before the latter is removed.

The ovarian artery passes towards the uterus in the ovario-pelvic ligament and runs below the Fallopian tube to the angle of the uterus, where it anastomoses with the uterine artery. It is ligatured in the ovario-pelvic ligament (Plate III., *a*) when the ovary is removed with the uterus; or at its anastomosis with the uterine (Plate III., *b*) when the ovary is left in the pelvis. In ligaturing the ovarian the broad ligament is transfixed so that the peritoneum is included in the ligature. When the vessel is ligatured at the anastomosis with the uterine, the same ligature embraces the Fallopian tube and closes it.

The uterine artery passes through the cellular tissue at the base of the broad ligament coming into relation with the uterus at the junction of the body and the cervix, and runs upwards alongside of the uterus to anastomose with the ovarian. About an inch from the uterus the ureter on its way to the bladder hooks under it (fig. 65). The uterine artery is usually ligatured close beside the uterus (Plates III., *c*); and to do this the broad ligament must be opened up so as to expose the artery in the cellular tissue. In ligaturing the uterine arteries, the peritoneum is not included in the ligature. If this is done, it interferes with the formation of the peritoneal flap to be presently described. Where the parametric cellular tissue and glands are removed in Wertheim's operation for cancer, the uterine artery is ligatured farther out near the side wall of the pelvis before it gives off the vaginal arteries (Plate III., *d*).

The round ligament is also ligatured to control a branch which runs down it to anastomose with a branch from the deep epigastric artery (Plate III., *e*).

As regards the *peritoneum*, while this is intimately attached to the uterus over the greater part of its surface, it is loosely attached over the lower part of the anterior aspect of the uterus (lower uterine segment).

(See Plate IV., fig. 1, in which the extent of loose attachment is shown by a wavy line.) This line of loose attachment can be followed as a curve arching downwards from the insertion of the round ligament (Plate IV., fig. 2). In the amputation of the uterus at the level of the os internum (described sometimes as sub-total hysterectomy or simply as hysterectomy in contra-distinction to pan-hysterectomy, in which the cervix is removed with the uterus) the amputation is made at the dotted line in Plate IV., figs. 1 and 2, and the flap of peritoneum derived from the anterior aspect of the uterus is brought over the stump of the cervix so as to shut off from the peritoneal cavity the raw surface of amputation as also the ligatures controlling the uterine arteries (Plate IV., fig. 3).

The appearance, on looking into the pelvis after the operation, is seen at Plate IV., fig. 4. The continuous suture bringing the peritoneum
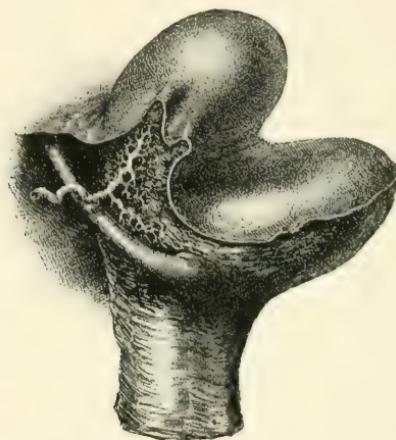
FIG. 65.—RELATION OF URETER TO UTERINE ARTERY (KELLY).

over the cervical stump in the middle line, and the layers of the broad ligament at the sides, shuts off the field of operation, with the ligatures on the vessels, from the peritoneal cavity.

HYSTERECTOMY (SUB-TOTAL).

The steps in the operation are as follows :

1. With the patient in the Trendelenburg position, the abdomen is opened in the middle line from umbilicus to pubes. The operator then investigates the conditions present and determines the extent of operation required, more especially satisfying himself as to whether the appendages must be sacrificed or may be conserved. The bowel is packed off with large swabs, and uterus drawn up with the hand. If it is a case of a
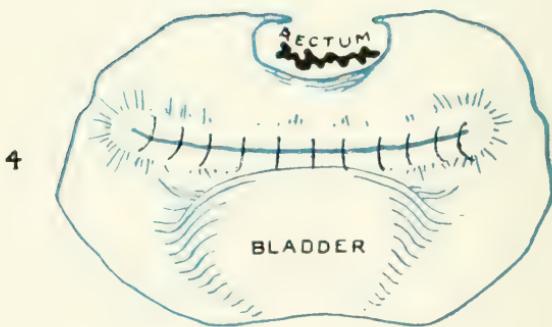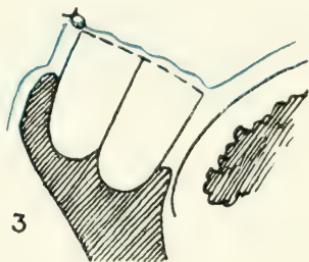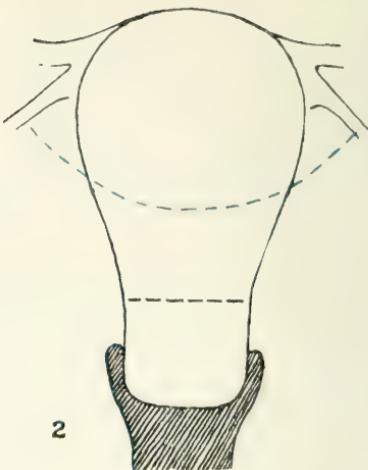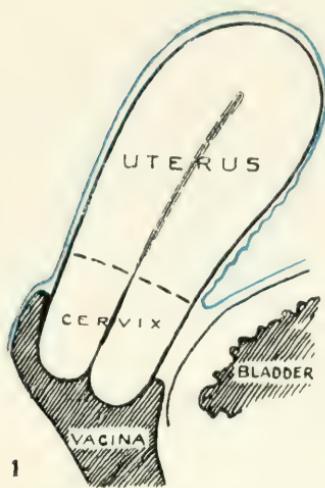
PLATE IV.

Disposition of peritoneum in relation to hysterectomy.

large fibroid, the incision is enlarged, the tumour laid hold of by a myoma-screw (fig. 66), and brought out of the abdomen.

2. The next step consists in controlling the ovarian vessels by double clamping and dividing the upper parts of the broad ligaments. If the ovaries are to be preserved, the clamps are placed between ovary and uterus, otherwise they are placed external to the ovaries, clamping the ovario-pelvic ligaments. The round ligaments are divided between forceps close to the uterus.

3. A peritoneal flap is then dissected off the anterior surface of the uterus from the blue dotted line downwards to the os internum (see Plate IV., fig. 2).

4. The lower part of the uterus being exposed on either side by opening up the broad ligament, the uterine arteries are divided between forceps, not at the base of the broad ligament, but after they have turned upwards along the side of the uterus. The uterus is then amputated at the same level as the division of the arteries (see Plate IV., fig. 3).

5. The upper aspect of the cervix may now be closed by interrupted

FIG. 66.—MYOMA-SCREW FOR DRAWING OUT UTERINE FIBROID.

sutures. The clamps controlling the three sets of vessels on either side are replaced by ligatures, the ligature being passed through the adjacent structures to prevent slipping.

6. The large raw surface in the pelvis is now completely covered by uniting the peritoneal edge behind to that in front by a continuous suture, the peritoneal flap already described being employed to cover the cervix. As the result, the field of operation is shut off from the peritoneal cavity (see Plate IV., fig. 4).

7. The pelvic cavity is cleansed, the large abdominal swabs removed and the abdomen closed.

PAN-HYSTERECTOMY.

This operation differs from the above in that the cervix is removed with the body of the uterus. The earlier steps are as in the operation just described. After division of the uterine vessels, the utero-sacral ligaments are clamped and divided, the peritoneum covering the posterior

aspect of the uterus is divided at the same level, and the upper part of the vagina exposed. Anteriorly the bladder is dissected off the cervix.

The anterior fornix is now opened, and through the opening the vaginal portion of the cervix is seized with a volsella and drawn upwards. The vagina is now divided all round the cervix, and the uterus and cervix completely freed and removed. The vaginal vessels are controlled by a stitch through each side of the divided vagina. The various clamps are replaced by ligatures, and the raw surfaces covered over by peritoneum as in the sub-total operation.

HYSTERECTOMY FOR CANCER OF THE CERVIX
(Wertheim's Operation).

This operation aims at the complete removal of the uterus and its appendages, and the cellular tissue with lymphatic glands. The main danger in the operation, apart from shock and hæmorrhage, is damage to the ureters, and therefore at an early stage, after the ovario-pelvic and round ligaments have been divided near the lateral wall of the pelvis, the ureters are sought for and dissected out to their entrance into the bladder. The broad ligaments and uterine vessels are divided as far out as possible ; the bladder cleared from the cervix and upper part of the vagina anteriorly ; and by the division of the utero-sacral ligaments the vagina is cleared from the rectum posteriorly. A pair of curved clamps is then placed across the vagina from either side and the vagina divided *below* the clamp, so that uterus and cervix are removed enclosed in a cuff of vagina, thus diminishing the risk of implanting cancer cells in peritoneum and wound. As much cellular tissue and fat is removed from the side wall of the pelvis as possible, and the glands along the iliac vessels dissected away.

VAGINAL HYSTERECTOMY.

The advantages of removing the uterus by the vaginal instead of the abdominal route are that the peritoneal cavity is not opened into to the same extent, that drainage is easier, and that there is less shock to the patient. The drawbacks are that only a small tumour can be removed, and that the field of operation is restricted to the vaginal vault. For this reason, owing to the limited field of operation, vaginal hysterectomy is not now used for cancer of the cervix, for which the operation when first introduced was chiefly performed. As it implies less shock, it still has its place where a moderate-sized uterus has to be removed for other reasons.

The steps are as follows :

1. With the patient in the lithotomy position, a weighted speculum is

introduced into the vagina and the cervix drawn down by two strong
volsella, or by ligatures used to close the cervical canal. A circular
incision is then made through the mucosa of the vaginal portion of the
cervix below the lower limit of the bladder.

2. A cuff of mucous membrane is dissected round the cervix, the
bladder separated from the cervix until the utero-vesical pouch of peri-
toneum is reached and opened by scissors, and the opening enlarged until
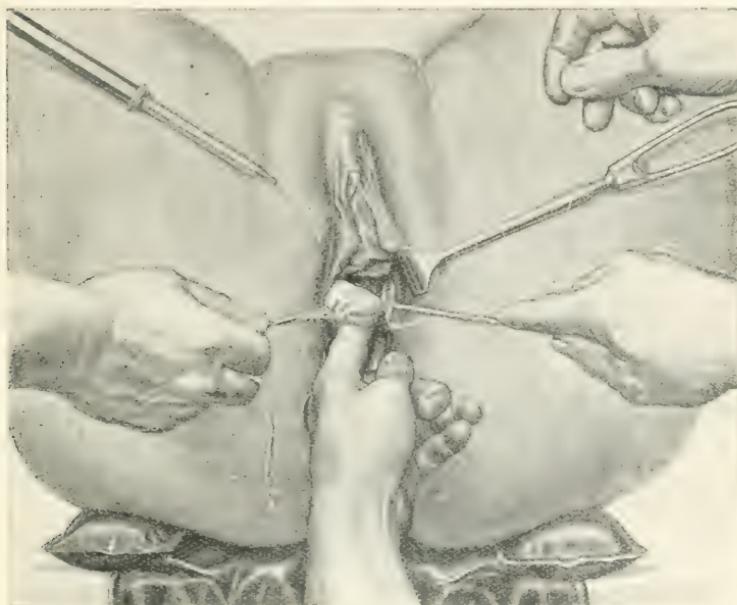
FIG. 67.—VAGINAL HYSTERECTOMY.

The cervical canal has been closed with three sutures. The pouch of
Douglas and the utero-vesical pouch having been opened into, the uterus is
being drawn over to the right side, and the ligature on the pedicle needle is
being carried through the base of the left broad ligament (Kelly).

the uterus is set free in front. The pouch of Douglas is opened into, so
that the uterus is now connected only by the broad ligaments.

3. The uterus is drawn downwards and to one side (fig. 67), and a
ligature carried through the parametric tissue of the opposite side and
tied ; a clamp is placed on the uterine side, and the tissue divided between
the transfixing ligature and the clamp. Another ligature is placed at a
higher level, the tissue again clamped and divided. Repeating this alter-
nately on either side, the uterus is brought down more and more, and the
tissue of the broad ligaments with the blood-vessels controlled by an

ascending series of ligatures until the upper margin of the broad ligament is reached. The important ligatures are those which control the uterine artery at the base of the broad ligament and the ovarian artery in its upper margin.

4. The uterus is now held only by the utero-sacral ligaments; these are divided between clamp and ligature, and the organ removed.

To diminish the cavity left and prevent herniation of the bowel, the broad and utero-sacral ligaments may be approximated by tying together the ligatures controlling them.

Passing from operations on the uterus to **operations on the uterine appendages,** we note that in their removal the ovarian artery must be ligatured in the ovario-pelvic ligament, and also at its anastomosis with the uterine artery below the uterine end of the tube (at *a* and *b* in Plate III.).
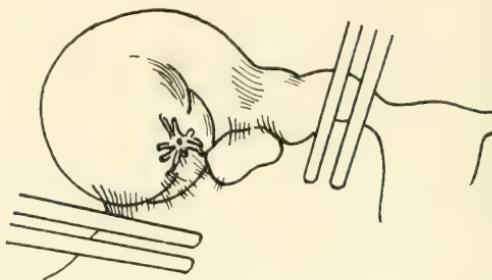
FIG. 68.—REMOVAL OF A PYOSALPINX.

Two pairs of forceps are applied to control the vessels and prevent escape of pus from the tube, which is cut away by dividing tissue between the forceps.

The technique for this is the same in the *removal of the uterine appendages,* of a dilated tube in operating for *pyosalpinx* or *extra-uterine gestation,* of a cystic or cirrhotic ovary by *oöphorectomy* or of an ovarian tumour by *ovariotomy.*

Removal of the Uterine Appendages, or salpingo-oöphorectomy. The ovario-pelvic ligament, and the uterine end of the tube with the vessels below it, are caught in two pairs of forceps; the tissue between the forceps is divided, and the appendages removed. The vessels are ligatured as they lie in the bite of the second pair of forceps, and the ligature and raw surfaces covered by peritoneum. When there are no adhesions the operation is a simple one, but difficult when there are extensive and firm adhesions.

Removal of a Pyosalpinx.—The time for operation and the difficulties of the operation have been already considered (see p. 66).

Full exposure of the field of operation is necessary, which must be shut off as far as possible by packing swabs round the structures to be removed. After the dilated tube has been freed from adhesions, forceps are applied as in fig. 68, and the operation completed as in the 'removal of the appendages'. If only the tube is removed, the forceps next the uterus clamp the tube only, not the vessels below it. Should the tube rupture, what escapes is mopped up at once, and it may be necessary to bring a gauze drain out at the lower angle of the abdominal incision.

Ruptured Tubal Gestation.—When there are symptoms of internal hæmorrhage, it is important to control the bleeding as soon as the abdomen is opened, and the operation is begun with the patient horizontal. The presence of free blood is indicated by the blue appearance of the peritoneum before it is incised. As soon as the peritoneal cavity is opened, without waiting to remove blood-clot, the hand is passed rapidly into the pelvis to ascertain on which side of the uterus the dilated tube lies, and to grasp the broad ligament so as temporarily to control the hæmorrhage. The blood and clots are now removed, the patient put in the Trendelenburg posture, and the ruptured tube dealt with as at fig. 68.

If the anatomical relations have been disturbed by blood extravasation into the cellular tissue, it may be difficult to define and clamp the broad ligament; in this case, after removing the tube and securing bleeding points, the cavity may have to be packed to stop oozing, and the packing brought out at the abdominal incision

OVARIOTOMY.

The abdomen is opened in the usual way, the length of incision depending on whether the tumour is to be tapped or not, and always being at least 4 inches long so as to allow the hand to be passed into the abdomen.

The following are the steps of the operation :

1. The hand is passed in to determine the presence of adhesions and the attachment of the tumour. Adhesions to the abdominal wall are most easily separated before the tumour is tapped, and adhesions to the intestines should be recognised at this stage lest they should tear or the bowel be injured when the tumour is being drawn out.

2. As the cyst is withdrawn, any adhesions to its surface are dealt with, longer ones being tied, shorter sponged off. The most troublesome are adhesions of the bowel, where great care is required not to injure the bowel in sponging it off the tumour ; the peritoneal edges of the raw surface produced on the intestine are drawn together by fine silk.

3. The tumour is now outside the abdomen with its pedicle at the incision. The pedicle consists of the broad ligament and tube. It may

be tied by transfixing it with a double ligature, the two halves being interlocked and thrown respectively round the ovario-pelvic ligament to control the uterine artery, and the Fallopian tube to control the anastomosis of the ovarian with the uterine, the ligature also shutting off the tube. It is better, however, to clamp the pedicle at either margin so as to control the vessels (fig. 69). The tumour is cut away, and the ligatures applied after its removal.

The needle carrying the ligature is introduced below the point of the forceps, and the ligature tied round one half of the pedicle, then brought round the whole, the forceps being loosened as the ligature is tightened. If the pedicle is broad, the margins containing the vessels are tied separately, and the broad ligament between the ligatures brought to-
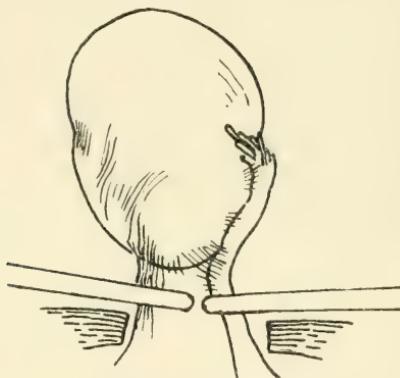
FIG. 69.—OVARIOTOMY.

The cyst is brought through the abdominal incision and forceps applied to the pedicle, which is afterwards ligatured.

gether with a continuous catgut suture which is also used to bring the peritoneum over the raw surface of the stump.

In the case of a large cyst, the size of the tumour may be reduced by tapping, so that it may be delivered through a shorter incision. The cyst is tapped by a trocar, and, as it collapses, forceps are applied in either side of the puncture to draw the tumour out of the abdomen. To further reduce the tumour by the breaking down of smaller cysts, the puncture in the cyst is enlarged so that the hand may be passed in and septa broken down with the finger. This is more safely done with the finger than the trocar, which might go through the cyst wall at another point and injure the intestines. Should the contents of the cyst be septic, as in a tumour with a twisted pedicle, or suspected to be malignant, as in a papillomatous cyst, the tumour must not be tapped.

Before closing the abdomen the other ovary is examined.

A *sessile ovarian cyst*, which has opened up the broad ligament, instead of pulling on its attachments so as to form a pedicle, has to be removed by enucleation as if it were a broad ligament cyst.

Broad Ligament Cysts.—In this case the tumour is wholly covered by peritoneum, and is *enucleated* from the broad ligament. This is done by incising the peritoneum over the tumour, shelling it out of its bed, ligaturing the vessels, and finally obliterating the space between the layers of the ligament by a continuous suture passing through both its layers.

In many cases, *e.g.* the parovarian cyst, the tumour by pulling on its attachment produces a pedicle, which can be treated like that of an ovarian cyst.

INDEX